

# **RSX-11M-PLUS**

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# CONTENTS

	Page
PREFACE	ix
CHAPTER 1	
RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS	
1.1	1-1
1.2	1-1
1.2.1	1-1
1.2.1.1	1-2
1.2.1.2	1-2
1.2.1.3	1-3
1.2.1.4	1-3
1.2.1.5	1-3
1.2.1.6	1-3
1.2.1.7	1-3
1.2.1.8	1-3
1.2.1.9	1-3
1.2.1.10	1-4
1.2.1.11	1-4
1.2.1.12	1-5
1.2.1.13	1-5
1.2.1.14	1-5
1.2.1.15	1-5
1.2.1.16	1-6
1.2.2	1-7
1.2.2.1	1-7
1.2.2.2	1-7
1.3	1-7
1.3.1	1-8
1.3.2	1-8
1.3.3	1-8
1.3.4	1-9
1.3.5	1-9
1.3.6	1-9
1.3.7	1-9
1.3.8	1-9
1.3.9	1-10
1.3.10	1-10
1.3.11	1-10
1.3.12	1-10
1.3.13	1-10
1.4	1-10
1.5	1-11
1.5.1	1-11
1.5.2	1-11
1.5.3	1-12
1.5.4	1-13
1.5.5	1-13
1.6	1-14
1.6.1	1-14
1.6.1.1	1-14
1.6.1.2	1-14
1.6.2	1-14
1.6.2.1	1-15
1.6.2.2	1-15
1.7	1-17

1.8	USER-DEFINED DEFAULT PROTECTION . . . . .	1-17
1.9	NAMED DIRECTORY SUPPORT . . . . .	1-17
1.10	DCL . . . . .	1-18
1.10.1	New DCL Features . . . . .	1-18
1.10.1.1	New DCL Commands . . . . .	1-18
1.10.1.2	New DCL Qualifiers . . . . .	1-20
1.10.1.3	Modified INITIALIZE/BAD BLOCKS command . . . . .	1-23
1.10.2	DCL Restriction . . . . .	1-23
1.11	NEW MCR FEATURES . . . . .	1-23
1.11.1	Decimal Version Numbers . . . . .	1-23
1.11.2	Network Command Terminal (NCT) . . . . .	1-23
1.11.3	New MCR Commands . . . . .	1-24
1.11.4	New MCR Keywords . . . . .	1-24
1.11.5	Modified MCR Keywords . . . . .	1-25
1.12	TDX . . . . .	1-25
1.12.1	Installing TDX . . . . .	1-25
1.12.2	TDX Commands . . . . .	1-25
1.12.3	Modifying the TDX Source File . . . . .	1-27
1.12.4	Installing Tasks Permanently . . . . .	1-28
1.13	INDIRECT COMMAND PROCESSOR . . . . .	1-29
1.13.1	New Indirect Features . . . . .	1-29
1.13.1.1	Changes to <TITYPE> Symbol . . . . .	1-29
1.13.1.2	New Delimiter for Symbols and Expressions . . . . .	1-29
1.13.1.3	New and Modified Directives . . . . .	1-29
1.13.1.4	New Special String Symbols . . . . .	1-30
1.13.1.5	New Error Message . . . . .	1-30
1.13.2	Indirect Restriction . . . . .	1-30
1.14	BRU . . . . .	1-31
1.14.1	New BRU Features . . . . .	1-31
1.14.1.1	Skipping Over a Bootable System Image . . . . .	1-31
1.14.1.2	New Device Support . . . . .	1-31
1.14.2	BRU Restrictions . . . . .	1-31
1.14.2.1	Do Not Specify /NEW_VERSION and /VERIFY Together . . . . .	1-32
1.14.2.2	Bootable System Image Restrictions . . . . .	1-32
1.14.2.3	Do Not Run BRU and BAD Simultaneously . . . . .	1-32
1.14.3	Supplementary BRU Information . . . . .	1-32
1.14.3.1	Changes in Placement of HELP Files . . . . .	1-32
1.14.3.2	Support for Multivolume Backups for Disks . . . . .	1-33
1.14.3.3	Modified BRU Qualifiers . . . . .	1-33
1.14.3.4	/MOUNTED Qualifier Error Message . . . . .	1-34
1.14.3.5	Additional Device Support . . . . .	1-34
1.14.3.6	Memory Requirements for Booting Stand-Alone BRU . . . . .	1-34
1.14.3.7	Change in Boot Block for Disk Copying . . . . .	1-34
1.15	FLX . . . . .	1-34
1.15.1	New FLX Feature . . . . .	1-35
1.15.2	FLX Restrictions . . . . .	1-35
1.15.2.1	DOS-11 Format . . . . .	1-35
1.15.2.2	Mount DOS-11 and RT-11 Devices as Foreign . . . . .	1-35
1.15.3	Supplementary FLX Information . . . . .	1-35
1.15.3.1	Handling an Error During a Copy Operation . . . . .	1-36
1.15.3.2	Image Mode Switch Default File Types . . . . .	1-36
1.15.3.3	Error Message . . . . .	1-36
1.16	FMT RESTRICTION . . . . .	1-36
1.17	SYSTEM MANAGEMENT . . . . .	1-36
1.17.1	New System Management Features . . . . .	1-37
1.17.1.1	New Options for Pre-Generated Kits . . . . .	1-37
1.17.1.2	ACNT Password Encryption . . . . .	1-37
1.17.1.3	Terminal Exercising . . . . .	1-37
1.17.1.4	New SHUTUP Feature . . . . .	1-38
1.17.1.5	New RMD Features . . . . .	1-38
1.17.1.6	New and Modified VMR Keywords . . . . .	1-38
1.17.1.7	New Data Terminal Emulator (DTE) Error Message . . . . .	1-38
1.17.2	System Management Restriction . . . . .	1-39
1.18	NEW CRASH DUMP ANALYZER FEATURES . . . . .	1-39

1.18.1	Assign Table . . . . .	1-39
1.18.2	Data Structures . . . . .	1-39
1.18.3	Device Support . . . . .	1-39
1.19	BATCH AND QUEUE RESTRICTITONS . . . . .	1-40
1.19.1	Restriction for Using /HOLD . . . . .	1-40
1.19.2	Do Not Use /DELETE and /RESTART Together . . . . .	1-40
1.20	SYSTEM LIBRARY ROUTINES . . . . .	1-40
1.20.1	Date Routine . . . . .	1-40
1.20.2	FCS Directory Parsing Code Enhancement . . . . .	1-42
1.21	TK50 OVERVIEW . . . . .	1-42
1.21.1	TK50 Performance Using RSX Utilities . . . . .	1-43
1.21.2	TK50 Indicator Lights . . . . .	1-45
1.22	I/O DRIVERS . . . . .	1-46
1.22.1	New I/O Driver Features . . . . .	1-46
1.22.1.1	Stall I/O for the RC25 . . . . .	1-46
1.22.1.2	RSX QIO DEUNA Driver . . . . .	1-46
1.22.1.3	Extended I/O Function . . . . .	1-47
1.22.1.4	Modified TF.TMO Subfunction . . . . .	1-47
1.22.1.5	New and Modified Magnetic Tape Driver Information . . . . .	1-47
1.22.1.6	New Disk Driver Error Code . . . . .	1-48
1.22.2	I/O Driver Restriction . . . . .	1-48
1.23	I/O OPERATIONS . . . . .	1-48
1.23.1	New I/O Operation Features . . . . .	1-48
1.23.1.1	File Specification Format Expanded . . . . .	1-48
1.23.1.2	Logical Name Parsing . . . . .	1-49
1.23.1.3	CSI\$4 Command Semantic Parser . . . . .	1-49
1.23.1.4	Changes in Parameters for Macros . . . . .	1-49
1.23.1.5	New Offsets In the File Descriptor Block (FDB) . . . . .	1-49
1.23.1.6	New Bit Definition for Wildcard Processing . . . . .	1-50
1.23.1.7	New Volume Label Format . . . . .	1-50
1.23.1.8	New File Header Label (HDR3) Format . . . . .	1-50
1.23.1.9	Modified Keywords for the Magnetic Tape Control Task . . . . .	1-50
1.23.1.10	Buffer Flush Routine . . . . .	1-50
1.23.2	I/O Operations Restrictions . . . . .	1-51
1.23.2.1	A User Task Record Buffer Is Required for Multiple Buffering . . . . .	1-51
1.23.2.2	A User Task Record Buffer is Required for Big Buffering . . . . .	1-51
1.24	NEW FEATURES FOR USER-WRITTEN DEVICE DRIVERS . . . . .	1-51
1.24.1	Using Asynchronous Buffered I/O . . . . .	1-51
1.24.2	Vectoring for Privileged Tasks and the Executive . . . . .	1-52
1.24.3	Converting to Vectored Access in Privileged Tasks . . . . .	1-53
1.24.4	Converting to Vectored Access in Drivers . . . . .	1-55
1.24.5	Overlapped I/O Completion . . . . .	1-55
1.25	ERROR LOGGING . . . . .	1-56
1.25.1	New Error Logging Features . . . . .	1-56
1.25.1.1	Internal I/O Operations . . . . .	1-56
1.25.1.2	Non-DIGITAL Device . . . . .	1-56
1.25.1.3	Error Logging Control Files . . . . .	1-57
1.25.1.4	DCL Error Logging Commands . . . . .	1-57
1.25.1.5	DCL SHOW ERROR LOG Command Qualifiers . . . . .	1-57
1.25.1.6	MCR ELI Command Switches . . . . .	1-58
1.25.2	Error Logging Restriction . . . . .	1-58
1.25.3	Supplementary Error Logging Information . . . . .	1-58
1.26	TASK BUILDER . . . . .	1-58
1.26.1	New Task Builder Features . . . . .	1-59
1.26.1.1	New TKB /SB Switch and DCL LINK/SLOW Qualifier . . . . .	1-59
1.26.1.2	New TKB /CL Switch and DCL /CODE:CLI Qualifier . . . . .	1-59
1.26.1.3	New MCR /FM Switch and DCL /CODE:FAST_MAP Qualifier . . . . .	1-60

1.26.1.4	FCSRES and FCSFSL Change . . . . .	1-60
1.26.1.5	TKB /CP Replaces /AL . . . . .	1-61
1.26.1.6	Creating a Task Builder with /SB as Its Default . . . . .	1-61
1.26.1.7	STKBLD.BLD Procedure . . . . .	1-62
1.26.2	Task Builder Restrictions . . . . .	1-62
1.26.2.1	Map Supervisor-Mode Libraries At Address 0 . . . . .	1-62
1.26.2.2	Do Not Use LINK /SLOW With Indirect Command Files . . . . .	1-63
1.26.2.3	Only Referenced Symbols Result in Autoload Vectors . . . . .	1-63
1.26.2.4	The First Library Specified Must Be First Library Entered . . . . .	1-63
1.26.2.5	Base Address Displayed Is Incorrect . . . . .	1-63
1.26.2.6	Do Not Cluster Read-Only and Read/Write Libraries . . . . .	1-63
1.26.2.7	You Should Use the /SS Switch with RSX11M.STB . . . . .	1-63
1.26.3	Supplementary Task Builder Information . . . . .	1-64
1.26.3.1	Two Forms of Symbol Definition in the .STB File . . . . .	1-64
1.26.3.2	I- and D-Space Task Autoload Vectors . . . . .	1-64
1.26.3.3	I- and D-Space Task Disk Block Allocation . . . . .	1-64
1.26.3.4	Segment Descriptor Block Size . . . . .	1-64
1.27	LAYERED PRODUCTS RESTRICTIONS . . . . .	1-65
1.27.1	Command Files Containing SET /UIC Commands . . . . .	1-65
1.27.2	FMS-11 . . . . .	1-65
1.28	MACRO-11 . . . . .	1-65
1.28.1	New MACRO-11 Features . . . . .	1-65
1.28.1.1	Support for Logical Names . . . . .	1-65
1.28.1.2	Corrections to the MACRO-11 Version 5.3 Assembler . . . . .	1-65
1.28.2	Supplementary MACRO-11 Information . . . . .	1-66
1.28.2.1	Version 5.2 RSX Changes . . . . .	1-66
1.28.2.2	Use of Colon in .ASCII and .ASCIZ Strings . . . . .	1-66
1.28.2.3	MCS Support . . . . .	1-67
1.28.2.4	Version 5.1 RSX-Specific Changes . . . . .	1-67
1.28.2.5	Corrections to the Version 5.1 Assembler . . . . .	1-67
1.28.2.6	Version 5.0 RSX-Specific Changes . . . . .	1-68
1.28.2.7	Corrections to the Version 5.0 Assembler . . . . .	1-68
1.29	DECMAIL-11 . . . . .	1-70
1.29.1	New DECmail-11 Feature . . . . .	1-70
1.29.2	DECmail-11 Restrictions . . . . .	1-70
1.29.2.1	Extended Logical Names Not Supported . . . . .	1-70
1.29.2.2	New DECmail-11 Installation Procedure . . . . .	1-71

## CHAPTER 2 CORRECTIONS TO DOCUMENTATION

2.1	RSX-11M-PLUS SYSTEM GENERATION AND INSTALLATION GUIDE . . . . .	2-1
2.1.1	SYSGEN Questions Removed . . . . .	2-1
2.1.2	Update Procedure . . . . .	2-1
2.2	RSX-11M-PLUS COMMAND LANGUAGE MANUAL . . . . .	2-1
2.2.1	SHOW DEVICES Command Format . . . . .	2-2
2.2.2	Description of RUN/COMMAND . . . . .	2-2
2.2.3	Additions to Qualifiers . . . . .	2-2
2.2.4	Corrections to Qualifier Descriptions . . . . .	2-3
2.2.5	Miscellaneous Errors . . . . .	2-3
2.2.6	Additional Task Status Flags . . . . .	2-4
2.2.7	Additional Error Message . . . . .	2-4
2.3	RSX-11M/M-PLUS MCR OPERATIONS REFERENCE MANUAL . . . . .	2-4
2.4	RSX-11M/M-PLUS INDIRECT COMMAND PROCESSOR MANUAL . . . . .	2-5
2.4.1	<SYSTEM> Symbol Value . . . . .	2-5
2.4.2	Invalid Condition for .ONERR . . . . .	2-5
2.4.3	.ASK Time-out Values . . . . .	2-5
2.5	RSX-11M/M-PLUS AND MICRO/RSX EXECUTIVE REFERENCE MANUAL . . . . .	2-6

# CONTENTS

2.5.1	Parameter List for CALL RCTLON and CALL RCTLOG . . . . .	2-6
2.5.2	Parameter List for RLON\$ and RLOG\$ . . . . .	2-6
2.5.3	Macro Expansion for the RLON\$ Directive . . . . .	2-6
2.5.4	Parameter List for CALL TRALON and CALL TRALOG . . . . .	2-6
2.5.5	Parameter List for TLON\$ and TLOG\$ . . . . .	2-6
2.5.6	Macro Expansion for the TLON\$ Directive . . . . .	2-7
2.6	RSX-11M/M-PLUS SYSTEM MANAGEMENT GUIDE . . . . .	2-7
2.7	RSX-11M/M-PLUS AND MICRO/RSX DEBUGGING REFERENCE MANUAL . . . . .	2-7
2.8	RSX-11M/M-PLUS BATCH AND QUEUE OPERATIONS MANUAL . . . . .	2-7
2.8.1	SUBMIT Command Format . . . . .	2-7
2.8.2	/[NO]TRANSFER Qualifier Description . . . . .	2-8
2.8.3	Batch Log Information . . . . .	2-8
2.9	RSX-11M/M-PLUS UTILITIES MANUAL . . . . .	2-8
2.9.1	BRU . . . . .	2-8
2.9.1.1	Indirect Command Files . . . . .	2-9
2.9.1.2	Wildcards in Input Specifications . . . . .	2-9
2.9.1.3	/NOSUPERSEDE Qualifier Description . . . . .	2-9
2.9.1.4	/VERIFY Qualifier Description . . . . .	2-9
2.9.1.5	Changes to Stand-Alone BRU . . . . .	2-10
2.9.1.6	Tape Write Error Message . . . . .	2-10
2.9.1.7	MANUAL Option . . . . .	2-10
2.9.2	DMP . . . . .	2-10
2.9.2.1	New /LIM Switch . . . . .	2-11
2.9.2.2	/HF Switch Description . . . . .	2-11
2.9.3	FLX . . . . .	2-11
2.9.3.1	Transfer Mode Switches . . . . .	2-11
2.9.3.2	Default File Types for the Image Mode Switch . . . . .	2-11
2.9.3.3	/ZE Switch Description . . . . .	2-12
2.9.3.4	/DE/RT Switch Example . . . . .	2-12
2.9.3.5	/NU/RT Switch Example . . . . .	2-12
2.9.3.6	Additional Error Message . . . . .	2-12
2.9.4	FMT . . . . .	2-12
2.9.5	LBR . . . . .	2-12
2.9.5.1	User File Attributes . . . . .	2-13
2.9.5.2	Create Switch (/CR) . . . . .	2-13
2.9.5.3	/IN Switch Description . . . . .	2-13
2.9.6	PAT . . . . .	2-13
2.9.7	PIP . . . . .	2-14
2.9.7.1	/DD Switch Format . . . . .	2-14
2.9.7.2	/TD Switch Format . . . . .	2-14
2.9.8	SLP . . . . .	2-14
2.9.8.1	Inaccurate Example . . . . .	2-14
2.9.8.2	Maximum Number of Characters in File Names . . . . .	2-15
2.9.8.3	SLP Error Message . . . . .	2-15
2.10	IAS/RSX-11 SYSTEM LIBRARY ROUTINES REFERENCE MANUAL . . . . .	2-15
2.10.1	Virtual Address Units . . . . .	2-15
2.10.2	Additional SYSLIB Routines . . . . .	2-16
2.10.3	Miscellaneous Errors . . . . .	2-16
2.11	RSX-11M/M-PLUS AND MICRO/RSX TASK BUILDER MANUAL . . . . .	2-16
2.11.1	Miscellaneous Errors . . . . .	2-17
2.11.2	Errors in Overlay Capability . . . . .	2-17
2.11.3	Supervisor-Mode Libraries . . . . .	2-18
2.11.4	Additions to Building SUPER . . . . .	2-18
2.11.5	Using the /-PI and /LI Switches Together . . . . .	2-18
2.11.6	/SHAREABLE:LIBRARY Qualifier Description . . . . .	2-19
2.11.7	Changes to the Task Label Block . . . . .	2-19
2.11.8	Changes to the Resident Common/Library Name Block Date . . . . .	2-19
2.11.9	Additional Error Message . . . . .	2-19
2.12	RSX-11M-PLUS GUIDE TO WRITING AN I/O DRIVER . . . . .	2-20
2.12.1	Data Structures and Control Blocks . . . . .	2-20
2.12.2	GTPKT\$ Macro Call Arguments . . . . .	2-20
2.12.3	Unit Status Byte . . . . .	2-20
2.12.4	Description of US.PUB . . . . .	2-20
2.12.5	Description of U.BUF . . . . .	2-21

# CONTENTS

2.12.6	Status Control Block . . . . .	2-21
2.12.7	Additional Information for the K.OWN Function . . . . .	2-21
2.12.8	Inputs for \$ASUMR . . . . .	2-21
2.12.9	Incorrect Reference . . . . .	2-21
2.12.10	Unclear SCBDF\$ Definition . . . . .	2-21
2.13	RSX-11M/M-PLUS ERROR LOGGING MANUAL . . . . .	2-22

## CHAPTER 3 RMS-11 VERSION 2.0 RELEASE NOTES

3.1	NEW FEATURES . . . . .	3-1
3.1.1	New Resident Library Configuration . . . . .	3-1
3.1.2	New Interface To RSX Logical Names . . . . .	3-3
3.1.3	Remote Access to RSTS/E Systems . . . . .	3-3
3.1.4	New Utilities Features . . . . .	3-3
3.1.4.1	RMSCNV . . . . .	3-3
3.1.4.2	RMSBCK, RMSDSP, and RMSRST . . . . .	3-4
3.2	SOFTWARE RESTRICTIONS . . . . .	3-4
3.2.1	RMS-11 Access Methods . . . . .	3-4
3.2.2	RMS-11 Utilities . . . . .	3-5
3.3	CORRECTIONS TO PROBLEMS WITH THE PREVIOUS RELEASE . . . . .	3-6
3.3.1	RMS-11 Access Methods . . . . .	3-7
3.3.2	RMS-11 Utilities . . . . .	3-7
3.4	DOCUMENTATION CORRECTIONS . . . . .	3-9
3.4.1	RSX-11M/M-PLUS RMS-11 User's Guide . . . . .	3-9
3.4.2	RSX-11M/M-PLUS RMS-11 Macro Programmer's Guide . . . . .	3-10
3.4.3	RSX-11M/M-PLUS RMS-11 Utilities . . . . .	3-10
3.5	FILES AND PLACEMENT ON THE DISTRIBUTION KIT . . . . .	3-10
3.6	RMS-11 VERSION 2.0 INSTALLATION . . . . .	3-13
3.6.1	Startup Command Procedures . . . . .	3-13
3.6.2	Utility Configurations . . . . .	3-14
3.6.2.1	Utility Command and ODL Files . . . . .	3-14
3.6.2.2	Rebuilding the Utilities . . . . .	3-15
3.7	REPORTING PROBLEMS . . . . .	3-15

## APPENDIX A THE DIGITAL EQUIPMENT COMPUTER USER'S SOCIETY (DECUS)

A.1	DECUS GOALS . . . . .	A-1
A.2	DECUS ACTIVITIES . . . . .	A-1

## APPENDIX B REPORTING PROBLEMS

## APPENDIX C APPLYING CORRECTIONS TO SOURCE FILES

C.1	UPDATING AN EXECUTIVE SOURCE MODULE . . . . .	C-1
C.2	UPDATING AN MCR SOURCE MODULE . . . . .	C-2
C.3	UPDATING A DCL SOURCE MODULE . . . . .	C-4
C.4	APPLYING CORRECTIONS TO THE FILE SYSTEMS (FllACP) . . . . .	C-5
C.5	APPLYING CORRECTIONS TO RECONFIGURATION TASKS CON AND HRC . . . . .	C-7
C.6	APPLYING FCS CORRECTIONS . . . . .	C-9
C.7	UPDATING THE FCS SOURCES . . . . .	C-9
C.8	ASSEMBLING FCS . . . . .	C-9
C.9	REPLACING THE FCS OBJECT MODULES . . . . .	C-12
C.10	PATCHING OBJECT MODULES . . . . .	C-12

## INDEX

## **PREFACE**

### **MANUAL OBJECTIVES**

The RSX-11M-PLUS Release Notes contain vital information for using the RSX-11M-PLUS Version 3.0 operating system. Read this document before generating and using your system.

This manual contains the following categories of information:

- Descriptions of new software features as well as changes in existing software features
- Descriptions of software restrictions as well as incompatibilities with previous versions
- Supplementary information from previous release notes that is still valid and has not yet been incorporated into the appropriate manuals
- Corrections to documentation errors and omissions, and references to new locations of information that has been moved

### **INTENDED AUDIENCE**

This manual is intended for all users of the RSX-11M-PLUS Version 3.0 operating system.

### **STRUCTURE OF THIS DOCUMENT**

This manual consists of three chapters and three appendices. They are described as follows:

#### **CHAPTER 1 RSX-11M-PLUS Software Features and Restrictions**

The first section of this chapter contains a list of the major new features developed for this release. The following sections are devoted to the major components of the RSX-11M-PLUS operating system. Each component's section contains a complete description of new software features, restrictions, and supplementary release note information for that system component. If a system component has no new features, restrictions, or supplementary information, then a section describing that information is not included.

## PREFACE

### CHAPTER 2 Corrections to RSX-11M-PLUS Documentation

Chapter 2 contains corrections to omissions and errors in your RSX-11M-PLUS documentation set. Section titles in this chapter are the titles of manuals that require correction. Section numbers and page numbers for corrections are supplied. This chapter also includes references to new locations of documentation that has been moved.

### CHAPTER 3 RMS-11 Version 2.0 Release Notes

This chapter contains descriptions of new features and restrictions for RMS-11 Version 2.0. Although the RMS-11 version number has not changed since the last release, new features have been added.

### APPENDIX A DIGITAL Equipment Computer Users Society (DECUS)

Appendix A briefly describes the DIGITAL Equipment Computer Users Society (DECUS). The goals and activities of DECUS are described, and information is provided about becoming a member.

### APPENDIX B Software Performance Reports (SPRs)

Appendix B describes the Software Performance Report (SPR) and tells you how to fill one out.

### APPENDIX C Making Corrections to Source Files

Appendix C describes procedures for applying corrections to files on the source disk.

### CONVENTIONS USED IN THIS MANUAL

The following conventions are observed in this manual:

Convention	Meaning
<code>CTRL/a</code>	A symbol that indicates the CTRL key; it must be held down while another key is pressed. For example, <code>CTRL/Z</code> means hold down CTRL while pressing Z. In examples, this control key sequence is shown as <code>^a</code> ; for example, <code>^Z</code> indicates the result of <code>CTRL/Z</code> , because that is how the system echoes most control key combinations.
<code>xxx</code>	A 1- to 3-character key symbol. For example, <code>RET</code> indicates the RETURN key, <code>LF</code> indicates the LINE FEED key, and <code>ESC</code> indicates the ESC key.



## PREFACE

### Convention

### Meaning

^

The circumflex character, when appearing with another character, represents the system response to receiving a control character. For example, when you type `CTRL/Z` while running some system tasks, the system echoes `^Z`. (On some terminals, the up-arrow (^) character is used in place of the circumflex.)

>

The MCR prompting character that appears whenever control is returned to the user task terminal and the system is ready to accept input.

"print" and "type"

As these words are used in the text, the system prints and the user types.

red ink

Color of ink used to show all user-entered commands in examples.



## CHAPTER 1

### RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

The first section of this chapter contains a brief list of the major new features for RSX-11M-PLUS Version 3.0. The remaining sections describe the new software features, restrictions, and supplementary information for the various components of RSX-11M-PLUS.

#### 1.1 MAJOR NEW FEATURES FOR RSX-11M-PLUS VERSION 3.0

RSX-11M-PLUS Version 3.0 supports the following new software features:

- Named directories
- User-defined default protection
- New DCL and MCR commands and qualifiers
- Extended logical name support
- Disk data caching
- Password encryption
- Vectored Executive
- LAT terminal server support
- Checkpointable commons

#### 1.2 DEVICE SUPPORT

This section describes the new devices supported by RSX-11M-PLUS. Also included are device support restrictions.

##### 1.2.1 New Device Support Features

This section contains the following topics:

- Summary of new device support
- RD52 fixed disk
- RD53 fixed disk

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

- TK25 magnetic tape subsystem
- TK50 magnetic tape subsystem
- RQDX2 controller
- RQDX3 controller
- KDA50-Q controller
- RUX50 UNIBUS interface
- New processor support
- IPL11 and IPV11 are a layered product
- Data Terminal Emulator (DTE)
- Discontinued support
- Note regarding the DLV11-J
- Support for the LA50, LA100, LN01, and LN03 printers
- Modifying or removing support for the printers

### 1.2.1.1 Summary of New Device Support -

RSX-11M-PLUS supports the following new devices:

New terminal types:

DTC01	LA50
LA100	LA210
LN03	LQP02
LQP03	VT200-series
PRO-series	

New disk devices:

RD52	RD53
------	------

New magnetic tape devices:

TK25	TK50
TU80	

New controllers:

KDA50-Q  
RQDX2  
RQDX3  
RUX50

### 1.2.1.2 RD52 Fixed Disk -

The RD52 disk is a 5.25-inch fixed disk. The RD52 is soft sectored and field formattable. The maximum capacity of the RD52 is 30.97 megabytes.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.2.1.3 RD53 Fixed Disk -

The RD53 5.25-inch fixed disk has 2.3 times the capacity and 33 percent faster average access time than the RD52, making it possible to support larger applications. The RD53 requires the RQDX2 or the RQDX3 controller. The RD53 has a capacity of 71 megabytes.

### 1.2.1.4 TK25 Magnetic Tape Subsystem -

The TK25 magnetic tape subsystem consists of a TKQ25 controller for the Q-BUS and a TK25 streaming tape drive. The integrated subsystem consists of a tape drive and controller/formatter. The TK25 uses a DC600A 1/4-inch tape cartridge and stores data on serial data tracks in a serial serpentine recording method. The TK25 has a storage capacity of 60 megabytes for 8K-byte data records. Data recording is an 8000 bpi, modified GCR (group cyclical recording) method.

### 1.2.1.5 TK50 Magnetic Tape Subsystem -

The TK50 magnetic tape subsystem is an integrated subsystem that consists of a controller for the Q-BUS and a TK50 streaming tape drive. It is supported on the MicroPDP-11/23, MicroPDP-11/73, and MicroPDP-11/83, processors.

The TK50 controller handles all error recovery and correction, and internally buffers multiple outstanding commands. The tape drive reads and writes data on a 1/2-inch tape cartridge that is recorded at 6667 bpi on serial data tracks in a serial serpentine recording (Modified Frequency Modulation) method. The tape speed is 75 inches per second in streaming mode. For a more complete description of the TK50, as well as detailed information regarding performance expectations, see Section 1.21.

### 1.2.1.6 RQDX2 Controller -

The RQDX2 controller is a quad height Q-BUS disk controller. It supports the RX50, RD51, RD52, and RD53 disk drives.

### 1.2.1.7 RQDX3 Controller -

The RQDX3 controller is a dual height Q-BUS controller module with two data channels designed to replace the RQDX1 and RQDX2 quad height disk controllers. The RQDX3 controller supports the RX50, RD51, RD52, and the RD53 disk drives.

### 1.2.1.8 KDA50-Q Controller -

The KDA50-Q controller is the Q-BUS version of the UDA50 controller. It supports RA-type disks.

### 1.2.1.9 RUX50 UNIBUS Interface -

Support for the RUX50 UNIBUS interface for the 5.25-inch RX50 diskette and RX180 IBM-compatible diskette has been added.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.2.1.10 New Processor Support -

RSX-11M-PLUS supports the following new processors:

- MicroPDP-11/73
- MicroPDP-11/83
- PDP-11/84
- MicroPDP-11/23 (formerly the MicroPDP-11)
- LSI-11/73 - RSX-11M-PLUS supports the LSI-11/73 (KDJ11-A) processor module in two configurations. Configuration 1 is recommended wherever possible.

Configuration 1: (Not for use with RQDX1/2)

KDJ11-A (LSI-11/73) CPU module  
MRV11-D memory module with MXV11-B2 boot ROM set  
DLVJ1 (formerly DLV11-J) multi-line terminal module

Configuration 2:

KDJ11-A (LSI-11/73) CPU module  
MXV11-BF multifunction module with MXV11-B2 ROM set

This configuration should be used when the LSI-11/73 CPU is to be used with the RQDX1 or RQDX2 disk controllers. The memory on the MXV11-BF multifunction module should be set to start at location 0, and the other system memory should start above the MXV11 resident memory. Note that in this configuration the system Executive is running in memory which is not protected by parity checking.

### 1.2.1.11 IP11 and IPV11 are a Layered Product -

This release of RSX-11M-PLUS does NOT contain the IP11 driver software. This software has been unbundled from the operating system and is available only as a separate layered product. Unbundling the IP11 driver software will allow DIGITAL to provide IP11 customers with new releases of the driver software in a more timely and effective manner.

With the introduction of this new IP11 driver layered product, DIGITAL will be providing services for this product separately from the RSX operating systems. Software Product Services contract customers are entitled to:

- Software Licenses and distribution kits for the IP11 Driver for a nominal charge
- Support for the IP11 driver, at no extra charge, for the current term of their RSX contract

For further information, please contact your Software Product Services representative.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.2.1.12 Data Terminal Emulator -

Data Terminal Emulator (DTE) supports the following additional modems:

DF03  
DF112  
DF224

### 1.2.1.13 Discontinued Support -

RSX-11M-PLUS no longer supports the following devices (however the drivers are still supplied):

- TU56 dual-drive DEctape cartridge tape subsystem
- DJ11 terminal interface

### 1.2.1.14 Note Regarding the DLVJ1 -

The DLVJ1, formerly called the DLV11-J, is not supported on systems that also include an RQDX1. Only one DLVJ1 per system is supported.

### 1.2.1.15 Support for the LA50, LA100, LN01, and LN03 Printers -

RSX-11M-PLUS supports the LA50, LA100, LN01, and LN03 printers. The LA50, LA100, LN01, and LN03 printers are capable of printing either 132 or 80 columns on 8 1/2-inch wide paper.

You can select support for these printers while performing a SYSGEN operation. During SYSGEN, this support is the default task-build option for the Queue Manager (QMG) and the Line Printer Processor (LPP).

In order to use an LA50, LA100, LN01, or LN03 printer, you set the printer type when you initialize the print processor by using a form type in the command line. The valid form types for initializing the print processor are as follows:

Form types	Printer type
125(decimal)	LA50
126(decimal)	LA100
127(decimal)	LN01
124(decimal)	LN03

For example, if you have an LA50 printer connected to terminal line TT6:, you use the following command to initialize the print processor:

(MCR)        **QUE TT6:/SP/FO:125./FL:1/LOWER**

(DCL)        **INITIALIZE/PROCESSOR TT6:/FORMS:125/FLAG:1/LOWER**

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

When you want to print a file, select your desired printer mode by including one of the following decimal form types in the command line:

Form types	Printer mode
3	132-column, draft quality. Also landscape mode for LN01 and LN03.
4	80-column, letter quality. Also portrait mode for LN01 and LN03.
5	132-column, letter quality. Also landscape mode for LN01 and LN03.
6	80-column, draft quality. Also portrait mode for LN01 and LN03.

For example, to print the 132-column draft quality TEST.LST file and the 80-column letter quality TEST.TXT file on an LA50 printer, use the following commands:

```
(MCR)          PRI /FO:3.=TEST.LST
                PRI /FO:4.=TEST.TXT

(DCL)          PRINT/FORM:3 TEST.LST
                PRINT/FORM:4 TEST.TXT
```

Note that these commands assume that you have assigned the default print queue, PRINT, to the processor handling the LA50.

### 1.2.1.16 Modifying or Removing Support for the Printers -

The printer options are controlled by task-build parameters in the build files for the Queue Manager and the Line Printer Processor. These build files are, respectively, [1,20]QMGBLD.BLD and [1,20]LPPBLD.BLD on the distribution kits.

Prior to building the queue manager and the line printer processor during SYSGEN, you can modify these files to do the following:

- You can change the form types that are used to represent printer types. To do so, modify the GBLDEF options that define the symbols Q\$LSPS and Q\$HSPS. The comments in the build files explain the values of the symbols. The normal defaults are 125(decimal) through 127(decimal).
- You can change the form types that are used to represent document types. To do so, modify the GBLDEF options that define the symbols Q\$LSPF and Q\$HSPF. The comments in the build files explain the value of the symbols. The normal defaults are 3 through 6. If you modify the range of form types, you must change the GBLPAT options that define the forms to include offsets appropriate for the new form types. (See the comments in the command file regarding form definition.)



## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

- You can remove the support for these printers altogether. This step may be necessary if you do not have any of these printers and if you use form types in the range 3 through 6(decimal) or 125 through 127(decimal). In order to remove the support, set the values of Q\$LSPS and Q\$LSPF to 1 and the values of Q\$HSPF and Q\$HSPS to 0. You may also want to remove the four GBLPAT definitions for the form types 3 through 6.

### Note to LA100 Users

If you have an LA100 printer and you use it for standard 132-column, 14 1/2-inch paper, you probably will wish to establish it as your standard printer, with form type 0, and not use this support. This support is intended primarily for applications including all three printers and involving 8 1/2-inch wide forms.

### 1.2.2 Device Support Restrictions

The following device restrictions apply to device support:

- Use of the TK50 with utilities
- LK201 keyboard

#### 1.2.2.1 Use of the TK50 With Utilities -

If the TK50 is used with utilities other than BRU, or is used with the verify pass of BRU, degraded performance and/or capacity of the TK50 should be expected. The TK50 is only supported on MicroPDP-11/23, MicroPDP-11/73 and MicroPDP-11/83 processors. See Section 1.21 for more information about the TK50 magnetic tape.

#### 1.2.2.2 LK201 Keyboard -

Some non-English LK201 keyboards do not have a backslash (\) character key. To generate the CTERM enter-control-mode sequence on an LK201 keyboard, do as follows:

1. Press the CTRL key, and while holding it down, press the numeral 4 key.
2. Press the RETURN key.

## 1.3 SYSTEM GENERATION

This section contains new features for System Generation on RSX-11M-PLUS Version 3.0.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

System Generation supports the following new features:

- SYSGENS on VAX hosts
- New target system disks
- New processor support
- Optional new features
- Modified software performance monitor
- Crash device
- New device support
- New terminal support
- MSCP command and response rings
- IPL1 subsystem
- Creating directories
- Directory for nonprivileged tasks

### 1.3.1 SYSGENS on VAX Hosts

You can generate an RSX-11M-PLUS system on a VAX host computer running VAX-11 RSX. See Chapter 2 of the RSX-11M-PLUS System Generation and Installation Guide for more information.

### 1.3.2 New Target System Disks

The following devices are supported as target system disks:

RD52  
RD53

See Chapter 2 of the RSX-11M-PLUS System Generation and Installation Guide for more information.

### 1.3.3 New Processor Support

System Generation supports the following new processors:

LSI-11/73  
MicroPDP-11/73  
MicroPDP-11/83  
PDP-11/84

Also, the processor formerly named the Micro/PDP-11 is now the MicroPDP-11/23. This processor is still supported. See Chapter 3 of the RSX-11M-PLUS System Generation and Installation Guide for more information.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.3.4 Optional New Features

The following optional features have been added to SYSGEN:

- Disk data caching support
- Extended logical name support
- Fast-mapping facility support
- CTRL/C abort support
- Character translation support
- Decimal version numbers in file specifications

### 1.3.5 Questions for LAT and Terminal Driver Extended I/O

Two questions which are documented in the RSX-11M-PLUS System Generation and Installation Guide as being asked are no longer asked. They are:

CE122      Do you want host support for LAT terminal servers?

CE254      Do you want terminal driver extended I/O support?

Support for these features is included, however you must have DECnet support for LAT to function.

### 1.3.6 Modified Software Performance Monitor (SPM-11)

The SYSGEN question regarding Software Performance Monitor (SPM-11) support has been removed. SPM-11 support is always included in RSX-11M-PLUS. However, you must purchase the SPM-11 product from DIGITAL, separately from RSX-11M-PLUS.

The SPM-11 interface to RSX-11M-PLUS has been modified so that there is no additional overhead incurred by having the support in the system while SPM-11 is inactive.

### 1.3.7 Crash Device

The two SYSGEN questions regarding the crash device and the crash device unit have been combined into one question that asks for the crash device and crash device unit.

### 1.3.8 New Device Support

System Generation supports the following devices and controllers:

DH011	KDA50-Q	RD53	RUX50
DHV11	RC25	RQDX2	TK25
DEUNA	RD52	RQDX3	TK50
DZQ11			

See Chapter 3 of the RSX-11M-PLUS System Generation and Installation Guide for more information.

### 1.3.9 New Terminal Support

System Generation supports the following terminal types:

- DTC01
- LA210
- LN03
- LQP02
- LQP03
- PC3xx
- VT2xx

See Chapter 3 of the RSX-11M-PLUS System Generation and Installation Guide for more information.

### 1.3.10 MSCP Command and Response Rings

The SYSGEN questions about MSCP command and response rings have been deleted. The number of command and response rings is always 4.

### 1.3.11 IP11 Subsystem

Most of the SYSGEN questions regarding support for the IP11 industrial I/O subsystem are no longer in SYSGEN. The IP11 subsystem has its own installation procedure. There are two new questions in SYSGEN about Executive support for the IP11 subsystem. See Chapter 3 of the RSX-11M-PLUS System Generation and Installation Guide for more information.

### 1.3.12 Creating Directories

SYSGEN creates the directories for the listing and map files if the directories do not already exist on the output disk. See Chapter 3 of the RSX-11M-PLUS System Generation and Installation Guide for more information.

### 1.3.13 Directory for Nonprivileged Tasks

SYSGEN now asks for the library directory of the target system and builds the nonprivileged tasks into that directory instead of [1,54]. See Chapter 3 of the RSX-11M-PLUS System Generation and Installation Guide for more information.

## 1.4 PRESERVING CHANGES TO INSTALLED COMMONS

Changes made in the memory image of a common can only be preserved when the common is removed by installing the common with the /WB=YES option. If the common has been installed with the /WB=YES option, the REMOVE command writes the common, with its changes, into its original task image file, replacing the original image. When the common is reinstalled, the new version of the common (as it existed in memory when it was removed) is placed in memory.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### NOTE

The default behavior is not to write back commons when they are removed. This is different from the previous version, and may require the modification of applications dependent upon the old behavior.

### 1.5 NEW LOGICAL NAME FEATURES

Logical name support has been extended for RSX-11M-PLUS Version 3.0. This section contains descriptions of the following new features:

- Assigning logical strings
- Logical name translations
- Using logical names in the form ddnn:
- New directives
- FCS and RMS-11 support for logical names

#### 1.5.1 Logical Strings

On RSX-11M-PLUS systems with extended logical name support, you can make logical string assignments. Previously both the logical name and its equivalence string were limited to the form ddnn:. You can now use any alphanumeric characters for both the logical name and its equivalence string. No colon is required. For example, you can assign the logical string SYS\$LOGIN to DB3:[1,1].

The system maintains logical name and equivalence name pairs in the following logical name tables:

- Task logical name table -- contains logical name entries that are local to a particular task
- Session logical name table -- contains logical name entries that are local to a logged-in user
- Group logical name table -- contains logical name entries that can be used by users having the same group number
- System logical name table -- contains entries that can be accessed by any task in the system

#### 1.5.2 Logical Name Translations

On RSX-11M-PLUS systems with extended logical name support, a change has been made in the way that the system creates and translates logical assignments. Previously, when you created a logical name, the system immediately translated the assignment to the actual physical device. No further translation was necessary when the logical was used. Now, when you create a logical name, the system assigns the logical name to the given equivalence name, but no translation is done

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

until you use the logical name. When you reassign a logical name, all other logical names assigned to that logical name are also reassigned. For example, if you make the following logical assignments

```
ASN DB3:=SY:
ASN SY:[1,1]=SYS$LOGIN
```

and issue the SHOW LOGICALS command, you see the following assignments displayed:

```
SY = DB3:                (Local, Final, TT26:)
SYS$LOGIN = SY:[1,1]     (Local, TT26:)
```

If you use SYS\$LOGIN, it is fully translated to the physical device DB3:. If you reassign SY: to DB2:, and then use the logical string SYS\$LOGIN, SYS\$LOGIN translates to DB2:[1,1].

### NOTE

When RSX-11M-PLUS creates, displays, or translates logical name assignments, the colons are dropped from the logical name when used as part of a Files-11 file specification.

To disable recursive translation, you can make a logical assignment final (no further translation occurs) by using the /FINAL qualifier or switch.

### 1.5.3 Using Logical Names in the Form ddnn:

If you use the ddnn: format for both the logical name and its equivalence string, the system mimics the old behavior of the ASSIGN command, in that when the logical name is assigned, the equivalence string is fully expanded. If the expanded string is the specification of an existing system device, then the logical name is assigned to that device string and the translation is marked as final. If the expanded string is a device specification, but that device is not in the system, then you receive the error message: "Device not in system".

If the equivalence string translates to anything other than a device, the system interprets the command using the new functionality of ASSIGN and assigns the ddnn: value to the equivalence name. For example, if you make the following assignments

```
ASN DR3:=YY:
ASN [1,1]SYSLIB.OLB=SS:
ASN SS:=XX:
```

and then use the SHOW LOGICALS command, you see the following assignments displayed:

```
YY = DR3:                (Local, Final, TT26:)
SS = [1,1]SYSLIB.OLB     (Local, TT26:)
XX = SS:                 (Local, TT26:)
```

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.5.4 New Directives

The following new directives have been added so that you can access logical name support in your own tasks:

CLON\$ and CLOG\$	Create logical names
TLON\$ and TLOG\$	Translate logical names
RLON\$ and RLOG\$	Provide recursive translation
DLON\$ and DLOG\$	Delete logical names

The xxxN\$ form of each directive performs exact match creation, translation, and deletion of logical names. The xxxG\$ form of each directive has been provided to allow compatibility with the P/OS operating system.

On P/OS, if a logical name is used as a device, the colon on the end of the device string is considered a part of the logical name. On RSX-11M-PLUS, the colon is only a delimiter, and is not included in the logical name. Thus, the xxxG\$ directives are included on both systems but have slightly different functionalities to allow a single task to run on both systems.

If compatibility with P/OS is desired, use the xxxG\$ form of the directives and include trailing colons and leading zeroes in device logicals. For example, specify DR005: as opposed to DR5:. On P/OS, the xxxG\$ directives will work the same way as the xxxN\$ directives in that the exact string that is provided will be used. On RSX-11M-PLUS, the xxxG\$ directives will remove one or two trailing colons from a logical name, and will eliminate any leading zeros in the number of the ddnn: string.

The following directives are used for file system access:

ACHN\$  
PFCS\$  
PRMS\$

The ACHN\$ directive performs the same function as the current ALUN\$ directive. However, the ALUN\$ directive accepts input only in the form ddnn:. The ACHN\$ directive accepts any string as input. The PFCS\$ and PRMS\$ directives perform extensive logical expansion and merging, and were included to minimize the code added to FCS and RMS. See the RSX-11M/M-PLUS and Micro/RSX Executive Reference Manual for more information about these directives.

### 1.5.5 FCS and RMS-11 Support for Logical Names

File Control Services (FCS) and Record Management Services (RMS-11) have been modified to support logical names. For example, with the following command:

**ASSIGN DB3:[1,1] SYS:**

you can access files in DB3:[1,1] using the logical name SYS:.

See the RSX-11M/M-PLUS I/O Operations Reference Manual for more information on using logical names for file access.

## 1.6 EXECUTIVE

This section describes new features and supplementary information for the Executive on RSX-11M-PLUS Version 3.0.

### 1.6.1 New Executive Features

The Executive supports the following new features:

- New directives
- High-level language interface

#### 1.6.1.1 New Directives -

The Executive supports the following new directives:

Assign Channel (ACHN\$)  
Create Logical Name (CLON\$, CLOG\$)  
Delete Logical Name (DLON\$, DLOG\$)  
Test for Specified System Feature (FEAT\$)  
File Specification Scan (FSS\$)  
Get Default Directory (GDIR\$)  
Parse FCS (PFCS\$)  
Parse RMS (PRMS\$)  
Recursive Translation of Logical Name (RLON\$, RLOG\$)  
Receive By Reference or Stop (RRST\$)  
Set Default Directory (SDIR\$)  
Test for Specified Task Feature (TFEA\$)  
Translate Logical Name (TLON\$, TLOG\$)

#### 1.6.1.2 High-Level Language Interface -

All of the Executive directives that can be called from a high-level language can be used from FORTRAN and from other high-level languages.

### 1.6.2 Supplementary Executive Information

This section describes information from the previous version that applies to the Executive. Although this information is not new for Version 3.0, it is still valid. This information includes the following topics:

- Privileged tasks
- Changes made to Executive data structures



#### 1.6.2.1 Privileged Tasks -

This section describes privileged tasks and the Executive.

- The module DREIF makes special checks on send packets queued to a task to determine whether the UCB address in the packet is that of a virtual terminal. The purpose is to allow data to be sent to a slave task whose TI: is a virtual terminal.

If a user's task receives specially formatted send packets, then the slave task should be built with the /-SE switch. This sets the T3.NSD bit that prevents the new check from interpreting the UCB address field in the packet.

- For directives that take a TCB address in R0 as input, if R0 is greater than 140000, the TCB is mapped through APR 6.
- Because of the implementation of user I/D-space, the definitions of the user mapping register symbols (such as UISAR0) may point to either of the instruction (UINARx) or the data (UDSARx) registers. A similar situation exists with the kernel mapping register symbols. Privileged code must not locally define these symbols or assume they refer to a particular mapping register.
- Some Executive routines that were not previously in the Directive Partition may have been moved to this partition for Version 3.0. Thus, privileged code that calls Executive entry points should be checked to ensure that the entry points are still accessible.
- Drivers that address check their own buffers will have to change \$ACHKW/\$ACHKB/\$ACHRO to \$CKBFW/\$CKBFB/\$CKBFR/\$CKBFI. These new address check routines correctly maintain the partition I/O count.

#### 1.6.2.2 Changes Made to Executive Data Structures -

This section describes changes made to Executive data structures.

- To enhance buffered I/O, the bit T2.TIO, which previously allowed for only one buffered I/O per task, has been changed to the byte T.TIO, which allows a task to queue many buffered I/O requests simultaneously. This is one of the many changes made to the buffered I/O algorithm.
- Tasks that examine task headers must be altered, because the headers may no longer be in primary pool. Since many privileged tasks assign LUNs by loading the UCB address into the LUN table in the header, this may be a problem when upgrading to Version 3.0. Installing these tasks without an external header enables them to work until the tasks can be

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

modified to support external headers. You can add this support by entering the following commands:

```
.IF DF    X$$HDR

MOV      $$AHDB,KISAR6          ; MAP TASK HEADER
MOV      $$AHPT,R2              ; GET ADDRESS OF HEADER

.IFF      ;X$$HDR

MOV      $HEADR,R2              ; GET ADDRESS OF HEADER

.ENDC     ;X$$HDR
```

<Header manipulations using R2>

### NOTE

These instructions must be executed at system state and must not be mapped through APR6. Also the references to @\$HEADR require no modification. This code is necessary only to address header offsets other than the saved stack pointer.

- If the task has an external header, P.HDR in the PCB is now 0.
- Prototype TCBs (for tasks whose name is in the form ...XXX) can now reside in secondary pool. Therefore, any task that scans the PCB list should be modified to check for P2.SEC in P.ST2. If set, the TCB corresponding to that PCB is in secondary pool. A task that scans the installed task list should also be modified to scan \$PTCBL, which is the listhead of the secondary pool prototype TCBs.
- The word at offset 0.STAT+2 of the offspring control block is used to contain a secondary exit status, the TKTN abort code, which is filled in whenever the offspring exits. Previously, only the word at 0.STAT was used. Note that more words in the exit status region of the OCB may be used in the future.
- The addition of alternate CLI support has changed how CLIs are associated with individual users.

Bits 1 - 4 in the word U.MUP of the terminal's UCB are used to identify the CLI associated with that terminal. The bits form an offset into a table located at \$CPTBL in the Executive module SYSCM. This module contains a pointer to the CPB (CLI Parser Block) for the CLI. Since only 4 bits are used to form this offset, the system is limited to 16 CLIs.

- Tasks that use A.TCB (not to be confused with A.TCBL) must check a new bit, AS.PRO in A.STAT. If this bit is set, then A.TCB contains the 32-word physical bias of the prototype TCB rather than the virtual address of the TCB in primary pool. This means that tasks will have to remap an APR in order to access the TCB where needed.
- The following Accounting data structures have changed: the User Account Block (UAB), the System Account Block (SAB), and the Mount Transaction. Tasks can differentiate between Version 1.0 and Version 2.0 by the length of the block.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.7 DISK DATA CACHING

Disk data caching is a feature on RSX-11M-PLUS systems that enhances I/O performance by reducing the number of physical I/O requests directed to a disk.

The disk data caching option is selected by default on pregenerated RSX-11M-PLUS systems. Disk data caching can be chosen as a system generation option for RSX-11M-PLUS systems; it is included as part of the full-functionality Executive.

Disk data caching must be activated explicitly for a disk. You can activate, disable, override, monitor, or modify disk data caching using the commands discussed in Chapter 19 of the RSX-11M/M-PLUS System Management Guide.

### 1.8 USER-DEFINED DEFAULT PROTECTION

Previously, if protection was not explicitly provided through program control, protection was derived from a volume default defined by either the INITIALIZE or MOUNT commands. Now, because of support for user-defined default protection, you can use the MCR command SET /DPRO or DCL command SET PROTECTION/DEFAULT to define a default file protection value to be assigned to files you create. You can also define your default file protection by using the Account File Maintenance Program (ACNT). See the RSX-11M/M-PLUS MCR Operations Manual or the RSX-11M-PLUS Command Language Manual for more information.

### 1.9 NAMED DIRECTORY SUPPORT

RSX-11M-PLUS has support for named directories. Named directory support means that you can have alphanumeric directory names such as [DIRECTORY] or [NUMBER2]. To get named directories, use the MCR command SET /NAMED or DCL command SET DEFAULT/NAMED.

The default for RSX-11M-PLUS is still nonamed directory behavior. However, you can get default named directory behavior by using the account file maintenance program.

Also, a differentiation has been made between the protection UIC and the default directory. In named directory mode, the MCR command SET /UIC and DCL command SET UIC modify only the protection UIC. The MCR command SET /DEF and DCL command SET DEFAULT change only your default directory.

Because of this change, some oldstyle command files that contain SET /UIC or SET DEFAULT commands will not work properly. Before executing such command files, enter the MCR command SET /NONAMED or DCL command SET DEFAULT/NONAMED. These commands inform the system to translate the commands in the command file according to their original meanings. The SET /NONAMED or SET DEFAULT/NONAMED commands are necessary when installing layered products. See the RSX-11M/M-PLUS MCR Operations Reference Manual or the RSX-11M-PLUS Command Language Manual for more information.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.10 DCL

This section describes new features and a restriction for Digital Command Language (DCL) on RSX-11M-PLUS Version 3.0.

#### 1.10.1 New DCL Features

DCL supports the following new features:

- New DCL commands
- New DCL qualifiers
- Modified INITIALIZE/BAD\_BLOCKS command

##### 1.10.1.1 New DCL Commands -

The following are new commands for DCL:

```
ANALYZE/MEDIA[/qualifier[s]]
                /ALLOCATE=label
                /BADBLOCKS
                /BADBLOCKS/NOEXERCISE
                /[NO]EXERCISE[=(n,m)]
                /OVERRIDE
                /RETRY
                /SHOW
```

The ANALYZE/MEDIA command allows you to identify and determine the number of bad blocks on a disk. ANALYZE/MEDIA determines if bad blocks exist on a disk volume and records their locations for use by the BACKUP and INITIALIZE commands.

```
DEFINE[/qualifier[s]]
                /FINAL
                /GLOBAL
                /GROUP[:g]
                /LOCAL
                /LOGIN
                /SYSTEM
                /TERMINAL:ttnn:
                /TRANSLATION_ATTRIBUTES:TERMINAL
```

The DEFINE command equates a logical name to a physical device name, to all or part of a file specification, or to another logical name.

#### DELETE/DIRECTORY

The DELETE/DIRECTORY command deletes a directory on a Files-11 volume and removes its name from the volume's Master File Directory (MFD).

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

```
SET FILE[/qualifier[s]]  
    /END_OF_FILE:(BLOCK:n,BYTE:n)  
    /ENTER:synonym_filespec  
    /REMOVE  
    /REWIND  
    /TRUNCATE  
    /[NO]WARNINGS
```

The SET FILE command establishes certain file characteristics.

### SET HOST

The SET HOST command connects your terminal to another system.

### SET PASSWORD

The SET PASSWORD command allows you to change your password.

### SET UIC

The SET UIC command changes your User Identification Code (UIC).

```
SHOW CACHE[/qualifier]  
    /DEVICE=ddnn:  
    /RATE:n  
    /REGION=name
```

The SHOW CACHE command allows you to display system information on data caching.

### SHOW HOST

The SHOW HOST command displays the name of the processor to which your terminal is currently connected.

```
SHOW LOGICALS[/qualifier[s]]  
    /ALL  
    /GLOBAL  
    /GROUP[:g]  
    /LOCAL  
    /LOGIN  
    /SYSTEM  
    /TERMINAL:ttnn
```

The SHOW LOGICALS command displays logical name assignments.

### SHOW PROTECTION

The SHOW PROTECTION command displays your personal default file protection code.

### SHOW UIC

The SHOW UIC command displays your User Identification Code (UIC).

## 1.10.1.2 New DCL Qualifiers -

The following are new qualifiers for DCL:

```

APPEND[/qualifier[s]]
    /NOWARNINGS
    /REWIND
    /SHARED

ASSIGN[/qualifier[s]]
    /FINAL
    /GROUP:[g]
    /TRANSLATION_ATTRIBUTES:TERMINAL

COPY[/qualifier[s]]
    /ALLOCATION:n[.]
    /NONEW_VERSION
    /NOWARNINGS
    /OVERLAY
    /PRESERVE_DATE
    /REWIND
    /SHARED

CREATE/DIRECTORY[/qualifier]
    /NOWARNINGS
    /OWNER_UIC:[uic]

DEASSIGN[/qualifier[s]]
    /GROUP[:g]

DELETE[/qualifier[s]]
    /NOWARNINGS

DIRECTORY[/qualifier[s]]
    /NOWARNINGS
    /REWIND

DISMOUNT[/qualifier[s]]
    /TERMINAL:ttnn:

INITIALIZE[/qualifier[s]]
    /BAD_BLOCKS:arg
        NOAUTOMATIC
        (AUTOMATIC,MANUAL)
        (OVERRIDE,MANUAL)
    /DENSITY:arg
        HIGH
        LOW
    /LABEL:VOLUME_ACCESSIBILITY:"c"
    /PROFESSIONAL

INITIALIZE/UPDATE[/qualifier[s]]
    /LABEL:newvolumelabel
    /PROFESSIONAL

INSTALL[/qualifier[s]]
    /FAST_MAP
    /[NO]INTERPRETER
    /[NO]RESIDENT_HEADER
    /TRANSLATION_ROUTINE:n
    /[NO]WRITE_BACK

```

# RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

```

LINK[/qualifier[s]]
    /CODE:(arg[s])
        CLI
        FAST_MAP
    /[NO]PRINT

MOUNT[/qualifier[s]]
    /[NO]CACHE[:arg[s]]
    /OVERRIDE:arg
        IDENTIFICATION
    /PROCESSOR:arg
        UNIQUE

PRINT[/qualifier[s]]
    /AFTER:TOMORROW
    [NO]WARNINGS

PURGE[/qualifier[s]]
    /NOWARNINGS

REMOVE[/qualifier]
    /TRANSLATION_ROUTINE:n

RENAME[/qualifier[s]]
    /NOWARNINGS

RUN[/qualifier[s]]
    /[NO]IO_PAGE
    /READ_PARTITION:parname
    /[NO]SLAVE

SET DEFAULT[/qualifier]
    /[NO]NAMED_DIRECTORY

SET DEVICE[/qualifier[s]]
    /[NO]CACHE[:arg[s]]
        :CREATE[:regname] [:parname] [:n]
        :REGION[:regname]
        :[NO]DIRECTORY[:n]
        :[NO]OVERLAY[:n]
        :[NO]VIRTUAL[:n]
        :[NO]READAHEAD[:n]
        :[NO]LOGICAL[:n]

SET PROTECTION[/qualifier]
    /[NO]DEFAULT

SET SYSTEM[/qualifier[s]]
    /NETWORK UIC
    /POOL/LIMITS:arg
        HIGH=n
        LOW=n
        MINIMUM_SIZE=n
        TASK_PRIORITY=n

SET TERMINAL[/qualifier[s]]
    /[NO]ADVANCED_VIDEO
    /[NO]ANSI CRT
    /[NO]BLOCK MODE
    /[NO]CONTROL=C
    /[NO]DEC CRT
    /[NO]DTC01
    /[NO]EDIT MODE
    /[NO]HOSTSYNC

```

(continued on next page)

# RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

```

SET TERMINAL[/qualifier[s]] (Cont.)
    /[NO]INQUIRE
    /LA50
    /[NO]LA210
    /[NO]LN03
    /[NO]LQP02
    /[NO]LQP03
    /[NO]PARITY:arg
        ODD
        EVEN
    /[NO]PASTHRU
    /[NO]PRINTER PORT
    /[NO]PRO SERIES
    /[NO]REGIS
    /[NO]SOFT CHARACTERS
    /[NO]TRANSLATION_ROUTINE:n
    /[NO]TTSYNC
    /VT200_SERIES

SHOW ASSIGNMENTS[/qualifier[s]]
    /GROUP[:g]
    /TERMINAL:ttnn:

SHOW DEVICE[/qualifier[s]]
    /[NO]CACHE

SHOW SYSTEM[/qualifier[s]]
    /NETWORK UIC
    /POOL/LIMITS

SHOW TASKS[/qualifier[s]]
    /DEVICE:ddnn:

SHOW TERMINAL[/qualifier[s]]
    /[NO]ADVANCED_VIDEO
    /[NO]ANSI CRT
    /[NO]BLOCK_MODE
    /[NO]CONTROL=C
    /[NO]DEC CRT
    /[NO]DTC01
    /[NO]EDIT_MODE
    /[NO]HOSTSYNC
    /LA50
    /[NO]LA210
    /[NO]LN03
    /[NO]LQP02
    /[NO]LQP03
    /[NO]PARITY
    /[NO]PASTHRU
    /[NO]PRINTER PORT
    /[NO]PRO SERIES
    /[NO]REGIS
    /[NO]SOFT CHARACTERS
    /[NO]TTSYNC
    /VT200_SERIES

```



## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.10.1.3 Modified INITIALIZE/BAD\_BLOCKS command -

The DCL command INITIALIZE/BAD\_BLOCKS has been modified so that it is consistent with the MCR command INI /BAD. The changes are as follows:

- The INIT/BAD:OVERRIDE command is equivalent to the MCR command INI /BAD=[OVR]. Previously, it translated to the MCR command INI /BAD=[NOAUTO].
- The INIT/BAD:NOAUTOMATIC command has been added to DCL. It is equivalent to the MCR command INI /BAD=[NOAUTO].

### 1.10.2 DCL Restriction

This section describes a restriction for using DCL on RSX-11M-PLUS.

The following DCL commands do not accept a logical name in a format other than ddnn: for a device name:

ALLOCATE	SET DEVICE
DEALLOCATE	SHOW DEVICE
MOUNT	SHOW TERMINAL
DISMOUNT	

### 1.11 NEW MCR FEATURES

This section describes new features for the Monitor Console Routine (MCR) on RSX-11M-PLUS Version 3.0.

MCR supports the following new features:

- Decimal version numbers
- Network command terminals
- New MCR commands
- New MCR keywords
- Modified MCR keywords

#### 1.11.1 Decimal Version Numbers

If you select support for decimal version numbers during system generation, you can use them in file specifications. The system increments decimal version numbers in the same way as octal ones.

#### 1.11.2 Network Command Terminal (NCT)

NCT provides a means for establishing a remote connection from your terminal to other systems in a network. Use either the MCR command SET /HOST, or DCL command SET HOST, to establish a network connection to a remote node. These commands allow for transparent connections between RSX systems, or between RSX and VAX/VMS systems.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.11.3 New MCR Commands

The following are new MCR commands for Version 3.0:

#### ANCILLARY CONTROL DRIVER (ACD)

The ACD command loads and unloads character translation routines so that terminals that conform to other standards can use the DIGITAL Multinational Character Set (MCS).

#### DEFINE LOGICALS (DFL)

The DFL command defines, deletes, and displays logical name assignments on systems that select extended logical name support during system generation.

### 1.11.4 New MCR Keywords

The following are new MCR keywords for Version 3.0:

ASSIGN /FINAL  
/GROUP

CLI/ CTRLC

HOME /POS

INITIALIZE /POS

INSTALL /FMAP  
/WB

LOAD /VEC

MOUNT /[NO]CACHE

SET /[NO]ANSI  
/[NO]AVO  
/[NO]BLKMOD  
/[NO]CACHE  
/[NO]DEC  
/DEF  
/[NO]DPRO  
/[NO]EDIT  
/HOST  
/[NO]HSYNC  
/INQUIRE  
/[NO]NAMED  
/[NO]PARITY  
/PASSWORD  
/[NO]PASTHRU  
/[NO]PRINTER\_PORT  
/[NO]REGIS  
/[NO]SOFT  
/[NO]TTSYNC

UNLOAD /VEC

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.11.5 Modified MCR Keywords

The following MCR keywords have been modified for Version 3.0:

MOUNT /FPRO  
/PRO

SET /BUF  
/TERM

### 1.12 TDX

This section includes information about using TDX (a catch all task) on RSX-11M-PLUS Version 3.0. This section includes the following topics:

- Installing TDX
- TDX commands
- Modifying the TDX source file
- Installing tasks permanently

#### 1.12.1 Installing TDX

The TDX facility allows you to run uninstalled tasks and abbreviate command names. Any task installed with the task name ...CA. is treated as a catch all task. If MCR receives an unrecognized command, it searches for a task with that name and passes the command line to TDX.

To use TDX as the catch all task for your system, install it by using the following command:

**INS \$TDX/TASK=...CA.**

Once installed, TDX checks the typed command against its list of commands. If the commands match, TDX translates the command into a valid MCR command. The following section describes the TDX commands and their corresponding MCR commands.

#### 1.12.2 TDX Commands

TDX commands are a shorter way of specifying MCR commands and qualifiers. The following table lists the TDX commands, their MCR translations, and the definition for each command.

TDX Command	MCR Translation	Command Meaning
ATS	ACT /ALL	Displays the names of all active tasks in the system.
ATS ttnn:	ACT /TERM=ttnn:	Displays the names of all active tasks on the specified terminal.

(continued on next page)

# RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

TDX Command	MCR Translation	Command Meaning
CHD	SET /DEF	Displays the current default directory for terminal TI:.
CHD g m	SET /DEF=[g,m]	In named directory mode, changes the current default directory to the directory specified. In nonnamed directory mode, changes the current default directory and, if privileged, the protection UIC.
CHU	SET /UIC	Displays the protection UIC for terminal TI: and, if in nonnamed directory mode, the default UFD.
CHU g m	SET/UIC=[g,m]	In named directory mode, changes the current protection UIC to the UIC specified (privileged command). In nonnamed directory mode, changes the default directory and, if privileged, the protection UIC.
		CLR -- Clears the issuing terminal's screen and sets the cursor to 0,0. Returns exit status of EX\$SUC if the terminal is a CRT and EX\$WAR if it is not a CRT.
CRE file	PIP file=TI:	Creates a new file without invoking an editor.
CVT val	--	Evaluates an arithmetic expression, converts that expression into different formats, and displays all the formats on your terminal. CVT accepts input in octal (nnn or nn,nn) or decimal (nnn. or nn.,nn.) words or bytes, hexadecimal numbers (\$nnnn), radix-50 (%ccc) or ASCII ('c or "cc) characters, or arithmetic expressions using +, -, /, , and < .

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## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

TDX Command	MCR Translation	Command Meaning
DEL file(s)	PIP file(s)/DE	Deletes the specified file(s).
DIR [file[s]]	PIP [file[s]]/LI	Displays a directory listing at the terminal.
DLG	DEV /LOG	Displays information about all the logged-in terminals on the system.
DLN	NCP SHOW KNOWN NODES	Displays all known DECnet nodes.
FRE	PIP /FR	Displays the amount of available space on SY:, the largest contiguous space on SY:, the number of available file headers, and the number of file headers used.
FRE ddu:	PIP ddu:/FR	Displays the same information as FRE for a specified device.
PUR file(s)	PIP file(s)/PU	Deletes all but the latest version of a file.
SHQ	QUE/LI	Displays information about all entries in all print queues.
SYS	SET /SYSUIC	Displays the current system UIC.
TDX	--	Displays the current version of TDX.
TYP file(s)	PIP TI:=file(s)	Prints files on your terminal.

### 1.12.3 Modifying the TDX Source File

You may want to add other commands to TDX by modifying the source file, [24,10]TDX.MAC. Routines for the commands are at the end of the source file. To reassemble the source file after making additions, use the TDXASM.CMD file located in [24,24]. To rebuild TDX, follow the procedure for building nonprivileged tasks, described in the RSX-11M-PLUS System Generation and Installation Guide.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

If the command you enter does not match a TDX command, TDX attempts to use one of the following two MCR command options: (In the following examples, the letters xxx represent the first three characters of your command.)

- MCR> RUN \$xxx/TASK=xxxTnn/CMD="params..."

This option installs, runs, and then removes a task. "Params..." represents the command line that you enter. Your command line cannot exceed 39 characters, because TDX adds other characters to this line. If you want this option, place the following command in your LOGIN.CMD file:

ASN SY:=ZZ1:

- MCR> @SY:[loginuic]xxx.CMD or  
MCR> @LB:[libuic]xxx.CMD or  
MCR> @SY:[loginuic]CATCHALL.CMD or  
MCR> @LB:[libuic]CATCHALL.CMD

For this option, TDX searches for one of the @[...]xxx.CMD indirect command files, in the order indicated. Once TDX locates one of these files, the search stops. You can design the indirect command file to perform a variety of functions, such as installing tasks, providing HELP, or issuing error messages.

To use this option, place the following command in your LOGIN.CMD file:

ASN SY:=ZZ2:

Note that RSX-11M-PLUS Version 3.0 contains a sample indirect command file, [3,54]CATCHALL.CMD.

The option TDX uses depends on whether the logical devices ZZ1: or ZZ2: exist on your system. You can assign one of these devices in your LOGIN.CMD file. Note that the presence of the ZZ1: assignment masks the presence of the ZZ2: assignment. If no assignment is made, TDX will not exercise either option.

You can select an option by placing the following command in the system startup file:

ASN SY:=ZZn:/GBL

where n equals 1 or 2, depending upon which ZZn option you prefer.

TDX issues the following message if the command you enter does not match a TDX command or if TDX cannot locate the necessary task.

MCR -- Task not in system

### 1.12.4 Installing Tasks Permanently

You may want to install some tasks permanently, rather than invoke TDX to install them on an as-needed basis. It is advisable to permanently install the following types of tasks:

- Tasks requiring a larger increment than the default

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

- Tasks used frequently
- Tasks requiring commands longer than 39 characters

See the description of the INSTALL command in the RSX-11M/M-PLUS MCR Operations Manual for more information.

### 1.13 INDIRECT COMMAND PROCESSOR

This section contains new features and a restriction for Indirect on RSX-11M-PLUS Version 3.0.

#### 1.13.1 New Indirect Features

This section describes new features for the Indirect Command Processor (Indirect) on RSX-11M-PLUS Version 3.0.

Indirect supports the following new features:

- Changes to <TITYPE> symbol
- New delimiter for symbols and expressions
- New and modified directives
- New special string symbols
- New error message

##### 1.13.1.1 Changes to <TITYPE> Symbol -

The <TITYPE> symbol supports two new terminal types. The types and their corresponding octal codes are:

PC3xx series	35
VT2xx series	36

Also, the <TITYPE> symbol is evaluated whenever the terminal type is requested, not just when Indirect is initialized.

##### 1.13.1.2 New Delimiter for Symbols and Expressions -

Pound sign characters (#) as well as quotation marks (") can be used as delimiters for string symbols and expressions.

##### 1.13.1.3 New and Modified Directives -

The following directive is new for Version 3.0:

.TRANSLATE	Translates logical names.
.FORM	Acts as interface to FMS-11 forms driver.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

The following directives accept logical name assignments as a part of a file or device specifications:

.CHAIN	.OPEN	.TESTDEVICE
	.OPENA	.TESTFILE
	.OPENR	

### 1.13.1.4 New Special String Symbols -

The following special string symbols are new for Version 3.0:

<DIRECT>	On systems with support for named directories, contains the user's default directory string. On systems without support for named directories, contains the user's default UIC.
<SYTYP>	Contains a string describing the system type (for example, RSX-11M-PLUS).
<VERSN>	Contains the current system's version number (for example, 3.0).

### 1.13.1.5 New Error Message -

The following error message is new for Version 3.0:

AT. -- Logical name translation error

This error message appears when an error occurs during the translation of a logical name by the .TRANSLATE directive.

### 1.13.2 Indirect Restriction

This section contains a restriction for using Indirect on RSX-11M-PLUS.

The @/LB:module command line does not work when it is issued at a CLI prompt or from within a command file. No problem occurs when it is issued from within a library.

If the module name referenced is greater than 6 characters, Indirect truncates the name to 6 characters. When a file name is truncated, Indirect returns the following error message:

AT. -- File Not Found

Indirect assumes that the module name you wish to reference is only 6 characters long, since the module names are truncated to 6 characters by the librarian utility when the files are included in the command library.

This Indirect behavior will remain a restriction for RSX-11M-PLUS Version 3.0.

To avoid this problem, always specify a module name of 6 characters or less, when issuing the @/LB:module command line. Also, do not use the @/LB:module command line unless you plan to include command files in a command library.



## 1.14 BRU

This section describes new features, restrictions, and supplementary information for the Backup and Restore Utility (BRU) on RSX-11M-PLUS Version 3.0.

### 1.14.1 New BRU Features

BRU supports the following new features:

- Skipping over a bootable system image
- New device support

#### 1.14.1.1 Skipping Over a Bootable System Image -

BRU can detect and automatically skip over a bootable system image (for example, BRUSYS) when appending to or restoring from a magnetic tape. This feature allows you to place a BRU backup set onto a magnetic tape that contains a bootable system image at its beginning and also eliminates the need for a separate magnetic tape containing the bootable system image.

When BRU is used to append to or restore from a magnetic tape, there will be a small delay for rewinding the magnetic tape and skipping over the bootable system image. Otherwise, this feature is transparent. See the Section 1.14.2.2 for a restriction regarding the use of this feature.

#### 1.14.1.2 New Device Support -

BRU supports the following new devices:

Device	Mnemonic
TK50 cartridge tape drive	MU:
RD53 fixed disk	DU:

### 1.14.2 BRU Restrictions

The following restrictions apply to BRU:

- Do not specify /NEW\_VERSION and /VERIFY together.
- Bootable system image restrictions
- Do not use BRU and BAD simultaneously.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.14.2.1 Do Not Specify /NEW\_VERSION and /VERIFY Together -

Specifying the /NEW\_VERSION and /VERIFY qualifiers together is illegal. If you use these qualifiers together, you receive a "conflicting qualifiers" error message. The reason is that BRU cannot verify a restore operation when the /NEW\_VERSION qualifier is used, since the version numbers of the files on the output device may not correspond to the version numbers of the files on the input device.

### 1.14.2.2 Bootable System Image Restrictions -

When placing the first backup set on a magnetic tape that contains a bootable system image, you must specify /REW/APPEND. You cannot simply leave the magnetic tape positioned at the end of the bootable system image and then specify /APPEND.

Also, the /TAPE\_LABEL switch is ignored during a restore operation if there is a bootable system image at the beginning of the magnetic tape.

### 1.14.2.3 Do Not Run BRU and BAD Simultaneously -

On an RSX-11M-PLUS Version 3.0 BRUSYS stand-alone system, you should not run BRU and BAD simultaneously. BRU and BAD use common buffer space and running both tasks at the same time yields unpredictable results.

### 1.14.3 Supplementary BRU Information

This section contains information from the previous version that applies to BRU. Although this information is not new for Version 3.0, it is still valid. This section includes the following topics:

- Changes in placement of HELP files
- Support for multivolume backups for disks
- Modified BRU qualifiers
- /MOUNTED qualifier error message
- Additional device support
- Memory requirements for booting stand-alone BRU
- Change in boot block for disk copying

#### 1.14.3.1 Changes in Placement of HELP Files -

For Version 2.0 and Version 3.0 distribution kits, the HELP files are placed on the second, rather than the first, BRU backup set for magnetic tape kits or disk volume for RK07 kits. The transfer of these HELP files to your system disk occurs without any action required on your part.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

The BASTART.COMD file for the RK07 distribution kit has been modified. This command file invokes PIP in order to copy the HELP files from the second RK07 disk to your system disk.

### 1.14.3.2 Support for Multivolume Backups for Disks -

BRU performs multivolume backup operations for disks. You can copy a large disk onto several smaller disks or several smaller disks onto a mounted large disk. However, the disks to which you copy are in BRU format, not Files-11. This means that, before you can read what is saved on the disks, you must restore them with BRU. This process is similar to magnetic tape backup and restore operations.

The following new qualifier has been added to BRU to perform multivolume disk backups:

```
/IMAGE:SAVE
      :RESTORE
```

This qualifier specifies that you want to do a multiple disk-to-disk backup or restore operation. If you are doing a backup operation, you must specify the SAVE option on the command line. If you are doing a restore operation, you must specify the RESTORE option on the command line.

### 1.14.3.3 Modified BRU Qualifiers -

Because of the addition of multivolume disk backup support, the meanings of the following BRU qualifiers have changed:

/APPEND	Directs BRU to append a backup set from the input disk volume to the last backup set on the output tape, or on the output disk if you are using the /IMAGE qualifier.
/BACKUP_SET:name	Specifies the name of the backup set to be placed on magnetic tape or disk. For a mounted input or output disk during an image backup or restore operation, you can specify the full backup set file name with the /BACKUP_SET qualifier.
/DIRECTORY	Lists, at your terminal, the backup set names or files on the specified magnetic tape or disk volume.
/INITIALIZE	Specifies that you want to initialize the output disk during a tape-to-disk or disk-to-disk operation.
/INVOLUME	Specifies the volume label of the input disk.
/MOUNTED	Allows you to back up files from a disk that is mounted as a Files-11 volume.
/NEW_VERSION	Resolves file specification conflicts, which occur during either backup or restore operations to a mounted disk.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

**/SUPERSEDE** Specifies that when file specifications on the mounted output volume are identical to those on the input volume, the file on the output volume is deleted and replaced with the file from the input volume.

### 1.14.3.4 /MOUNTED Qualifier Error Message -

If you use the /MOUNTED qualifier when the input device is a magnetic tape, BRU issues a syntax error message. The purpose of this error message is to clarify to the user that magnetic tapes cannot be mounted as Files-11 volumes. Previously, BRU ignored this qualifier if the user issued it for a magnetic tape input device.

### 1.14.3.5 Additional Device Support -

BRU supports the following additional devices:

Type	Mnemonic
TSV05/TU80 magnetic tape	MS
ML11 electronic memory	EM
RA60/RA80/RA81/RC25/RD51/RD52/RX50 disk	DU

### 1.14.3.6 Memory Requirements for Booting Stand-Alone BRU -

Changes have been added to booting stand-alone BRU for RSX-11M-PLUS. The stand-alone BRU system BRUSYS, requires 124K-words of memory.

### 1.14.3.7 Change in Boot Block for Disk Copying -

On RSX-11M-PLUS, you can copy a DB:, DM:, EM:, DR:, or DU: type disk to any other of these controller types without having to resave the system, because the boot block for these devices is common. Use only the following command to write the correct boot block on the output disk:

MCR>SAVE/WB

## 1.15 FLX

This section describes a new feature, restrictions, and supplementary information for the File Transfer Utility program (FLX) on RSX-11M-PLUS Version 3.0.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.15.1 New FLX Feature

The following devices are valid RT-11 devices:

Device	Mnemonic
RX50 floppy disk	DU:
RD51 disk	DU:
RD52 disk	DU:
RD53 disk	DU:
RC25 fixed/removable disk	DU:
RCF25 fixed disk	DU:

Note that these are the only DU:-type devices that are supported by FLX as valid devices.

### 1.15.2 FLX Restrictions

The following restrictions apply to FLX:

- DOS-11 format
- Mount DOS-11 and RT-11 devices as foreign

#### 1.15.2.1 DOS-11 Format -

The following devices do not support DOS-11 format:

RA60	RD52
RA81	RD53
RC25	RX50
RD51	

#### 1.15.2.2 Mount DOS-11 and RT-11 Devices as Foreign -

DOS-11 and RT-11 devices must be mounted as foreign devices before you can use FLX.

### 1.15.3 Supplementary FLX Information

This section describes information from the previous version that applies to FLX. Although this information is not new for Version 3.0, it is still valid. This information includes the following topics:

- Handling an error during a copy operation
- Image mode switch default file types
- Error message

#### 1.15.3.1 Handling an Error During a Copy Operation -

The behavior of FLX has changed in handling an error during a copy operation to an RT-11 device.

Previously, FLX allowed a partial file to be created on the output device when insufficient space existed on this device for the complete file. Then, if a file existed on the output disk with the same name as the newly created partial file, FLX deleted the pre-existing file and substituted the partial file. This replacing of an existing file with a partial file resulted in a loss of information.

Now, if an error occurs during the copy operation, the partial file is not substituted for an existing file on the output disk. The partial file no longer is closed as a permanent entry, and the definition and contents of the existing file remain intact.

#### 1.15.3.2 Image Mode Switch Default File Types -

The file type .CDA should be added to the list of default file types for the image mode switch (/IM).

#### 1.15.3.3 Error Message -

The following error message should be added to FLX:

**FLX -- Device size exceeds 65K blocks**

**Explanation:** The DU device selected as an RT-11 device is not an RC25, RCF25, RD51, RD52, or RX50. Devices greater than 65K blocks cannot be supported with FLX.

**User Action:** Reenter the command line specifying a valid RT-11 device.

#### 1.16 FMT RESTRICTION

The following devices are not supported for the Disk Volume Formatter (FMT) on RSX-11M-PLUS Version 3.0:

RA60	RD52
RA81	RD53
RC25	RP07
RD51	RX50

#### 1.17 SYSTEM MANAGEMENT

This section describes new features and a restriction for system management on RSX-11M-PLUS Version 3.0.

#### 1.17.1 New System Management Features

The following new system management features are supported:

- New options for pre-generated kits
- ACNT password encryption
- Terminal exercising
- New SHUTUP feature
- New RMD features
- New VMR keywords
- New Data Terminal Emulator (DTE) error message

##### 1.17.1.1 New Options for Pre-Generated Kits -

Several enhancements have been made to SYSPARAM.DAT and STARTUP.CMD. The system parameter file LB:[1,2]SYSPARAM.DAT contains more information on the structure of these new options.

##### 1.17.1.2 ACNT Password Encryption -

Version 3.0 of RSX-11M-PLUS supports password encryption. When a new account is created, or the password for an existing account is changed, the password for that account is encrypted automatically by the Account File Maintenance Program (ACNT).

When a user runs ACNT and chooses either the DELETE or EXAMINE, or the LIST or MODIFY option, (ENCRYPTED) is displayed in the password field of the ACNT record. Password encryption support has been added for increased system security.

ACNT can no longer be used by non-privileged users to set their passwords. Non-privileged users can use the DCL command SET PASSWORD, and the MCR command SET /PASSWORD, to modify their passwords. Passwords can be a maximum of 39 characters, although accounts used for access by DECnet must restrict password length to 8 characters.

You can still build HELLO and ACNT with a user-supplied encryption routine, but that routine will only be used for existing accounts. New accounts will be created using the system-supplied encryption routine.

##### 1.17.1.3 Terminal Exercising -

The RSX-11M-PLUS Version 3.0 I/O Exerciser (IOX) supports terminal exercising. Terminals are exercised by using the LOOPBACK parameter to the SELECT command.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.17.1.4 New SHUTUP Feature -

Shut down messages include a "reason for shutdown" field in SHUTUP. You are prompted for the reason, and it is displayed in the system shutdown message.

### 1.17.1.5 New RMD Features -

There are two new displays about cache regions that have been added to the Resource Monitor Display (RMD). These are the RMD C page, which displays general statistics about a cache region, and the RMD D page, which displays detailed statistics about a cached device. Note that the bottommost line of the RMDemo D page will always be zero.

### 1.17.1.6 New and Modified VMR Keywords -

The following keywords are new for Virtual Monitor Console Routine (VMR) on RSX-11M-PLUS Version 3.0:

ASSIGN /SYSTEM

INSTALL /WB  
/FMAP

LOAD /VEC

SET /[NO]AVO  
/[NO]ANSI  
/[NO]BLKMOD  
/[NO]DEC  
/[NO]EDIT  
/[NO]HSYNC  
/[NO]PARITY  
/[NO]PASTHRU  
/[NO]PRINTER\_PORT  
/[NO]REGIS  
/[NO]SOFT  
/[NO]TTSYNC

UNLOAD /VEC

### 1.17.1.7 New Data Terminal Emulator (DTE) Error Message -

The following is a new error message for the Data Terminal Emulator (DTE):

?DTE-F-MODERR, Unable to determine modem type

When you receive this message, DTE has either not received a response from the modem or is unable to interpret the response.

Check to see that the modem is properly connected, and that the modem switches and port characteristics are properly set.



## 1.17.2 System Management Restriction

If you want to spool to the null device (NL:), you must specify the DCL command INITIALIZE/SHAREABLE or MCR command QUE /SHR when you initialize the print processor.

## 1.18 NEW CRASH DUMP ANALYZER FEATURES

The following are new CDA features for RSX-11M-PLUS Version 3.0:

- Assign table
- Data structures
- New device support

### 1.18.1 Assign Table

The System Assign Table has been changed. The table lists logical assignments in three categories: system logical assignments, group logical assignments, and user logical assignments. Also, the table includes the size in blocks and the status (privileged or nonprivileged, and whether the translation of the assignment is final) for each logical assignment.

### 1.18.2 Data Structures

Some system data structures have changed. See Appendix B of the RSX-11M/M-PLUS and Micro/RSX Crash Dump Analyzer Reference Manual for a list of changed data structures.

### 1.18.3 Device Support

You can specify any of the following new devices as the crash dump device for your system:

Device Type	Mnemonic
RA60 disk packs	DU:
RC25 removable disk cartridges	DU:
RX50 floppy diskette	DU:
TK50 magnetic tapes	MU:

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.19 BATCH AND QUEUE RESTRICTITONS

The following restrictions apply to batch and queue operations on RSX-11M-PLUS Version 3.0:

- Restriction for using /HOLD
- Do not use /DELETE and /RESTART together

#### 1.19.1 Restriction for Using /HOLD

You cannot use the /HOLD switch with an active batch job.

#### 1.19.2 Do Not Use /DELETE and /RESTART Together

When you SUBMIT a job with both the /RESTART and /DELETE switches, the system disregards the /RESTART switch. The system deletes a job once it starts, making it impossible to restart that job. For example, the following command:

```
SUB/RESTART/DELETE BATJOB.JOB
```

actually gets submitted as

```
SUB/NORESTART/DELETE BATJOB.JOB
```

Also, when you SUBMIT a job on a privately mounted disk using the /RESTART switch, you must use the /NOTTRANSFER switch if you expect the job to restart. This is because the system deletes all transferred jobs once they start, making them impossible to restart. Be aware that using the /NOTTRANSFER switch necessitates leaving your private disk attached to the system, so that the system can access the job without transferring it.

### 1.20 SYSTEM LIBRARY ROUTINES

This section describes new features for system library routines on RSX-11M-PLUS Version 3.0. SYSLIB supports the following new features:

- Date routine
- FCS directory parsing code enhancement

#### 1.20.1 Date Routine

For RSX-11M-PLUS systems with extended logical name support, SYSLIB contains a new alternate date routine that can be referenced by any user program. The new date routine allows users to print dates in a format not dependent upon the DIGITAL standard date format (dd-mmm-yy).

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

To use the new routine, you must build the SYSLIB modules, INTDAT or INTDAS (the normal version or the supervisor-mode version), into your program or library. These modules have been inserted into SYSLIB with entry points deleted. See RSX-11M/M-PLUS and Micro/RSX Task Builder Manual for a description of the /LB: switch which is used to build INTDAT and INTDAS.

The INTDAT and INTDAS modules contain the routines \$DAT and \$TIM. (See the IAS/RSX System Library Routines Reference Manual for a description of these routines.) The \$TIM routine has not been modified; it is included simply because it is a part of the standard module. The \$DAT routine's calling sequence remains the same, but the logical name SYS\$DATE\_FORMAT can contain the following attributes:

DD	print 2-digit day of month with leading zeros
ZD	print 2-digit day of month with leading zeros suppressed
MM	print 2-digit month number with leading zero
ZM	print 2-digit month number with leading zero suppressed
YY	print 2-digit year with leading zero
ZY	print 2-digit year with leading zero suppressed
MMM	print alphabetic month (not necessarily 3 characters long)

You can use additional characters (other than the uppercase letters D, Z, M, and Y) in SYS\$DATE\_FORMAT as delimiters. If SYS\$DATE\_FORMAT is not defined, you get the DIGITAL standard date format (dd-mmm-yy) by default. SYS\$DATE\_FORMAT can have a maximum length of 16 characters.

The logical SYS\$MONTH\_nn (where nn is 1 through 12) provides the alphabetic month to be printed when the mmm attribute is used. If SYS\$MONTH\_nn is not defined, you get the traditional 3-letter month abbreviations (mmm) by default. SYS\$MONTH\_nn can have a maximum length of 12 characters.

### Examples:

```
SYS$DATE_FORMAT = "MMM ZD, 19YY"
SYS$MONTH_06 = "June"
```

```
Output: June 4, 1985
.xp Dates, specifying
```

```
SYS$DATE_FORMAT = "DD.MMM.YY"
SYS$MONTH_06 = "VI"
```

```
Output: 04.VI.85
```

```
SYS$DATE_FORMAT = "ZD/MM/YY"
```

```
Output: 4/06/85
```

Logical translation is done in standard order. Therefore, a local terminal assignment can override a system-wide assignment, permitting the same program to produce output in the individual user's own language or preferred format.

There are two limitations to the alternate date routine. First, using it necessitates more output buffer space than the traditional format because the output produced can be as long as 25 characters. The standard \$DAT routine however, always produces either 8 or 9 characters. Second, the new module can be linked with many, but not all existing programs. An example of a program that cannot use this routine is one that performs operations on the resulting output string expecting it to be in the format produced by the standard routine.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.20.2 FCS Directory Parsing Code Enhancement

A new feature has been added to the directory parsing code in File Control Services (FCS). You can obtain the directory string used in the parse. An extension has been created for the FDB, which has the following format:

.Byte	Extension length
.Byte	Reserved
.Byte	Length of buffer for directory string
.Byte	Length of directory string (filled in by .PRSDI)
.Word	Address of directory string buffer

The extension block and directory string buffer are allocated in your address space. To obtain the directory string used in the parse, do the following:

- Enter the address of the buffer into the the proper word in the extension block.
- Enter the length of the buffer into the proper byte in the extension block.
- Enter the length of the extension into the proper byte in the extension block.
- Insert the address of the extension block at the offset F.EXT in the FDB.

When the directory parsing code detects that F.EXT has a nonzero value, it uses the value as an address and moves the directory string into the buffer. It also puts the length of the actual directory string into the byte in the extension. This directory will always be filled in, except when the directory is obtained from the default name block because the default name block does not contain the directory string. In this case, the directory length will be set to zero.

### 1.21 TK50 OVERVIEW

The TK50 tape subsystem is a streaming tape subsystem. As with all subsystems, if I/O commands are not issued to the tape unit quickly enough the tape unit drops out of streaming mode and into start/stop mode. While in start/stop mode, each I/O command issued incurs a time penalty (about one second for the TK50). Because the tape unit expects the next I/O command to be ready for processing when the current command finishes, it keeps the tape moving in the forward direction. It is this processing that allows the tape to stream, that is, maintain constant forward motion. However, if the next I/O command is not ready, the tape unit moves past the position on the tape where the I/O operation was to be performed. As a result, the tape has to be repositioned (backed up), to the correct position on the tape. It is this reposition operation that takes approximately one second to complete before the next I/O command can be processed. This reposition time can severely impact the performance of tape utilities if they are unable to issue commands to the controller fast enough.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

In order to alleviate the performance impact of the reposition time, a padding feature is enabled in the TK50 firmware. This allows the controller to issue up to a preset number of padding blocks during output to the tape in order to keep the tape streaming. Before each pad block is written, the controller checks to see if the next host I/O is ready for processing. If it is, then no more pad blocks are written and the host's I/O request is performed. If the next host command is not ready, the controller writes out another pad block. It continues to do this until either a host I/O command is ready for processing or the number of consecutive pad blocks written reaches a controller specified maximum. In the latter case, the tape unit will drop out of streaming mode and into start/stop mode. When the next write command is issued, the controller will reposition back over the pad blocks that it wrote before actually doing the write operation. As a result, tape capacity is not lost if the application cannot keep the unit in streaming mode. If the application does keep the unit partially in streaming mode, then some tape capacity will be lost due to the pad blocks. On input from TK50, the controller does not return any of these pad blocks to the application program. Because of this, padding is transparent to the user's application.

The following section describes performance and capacity impacts when using RSX utilities with the TK50.

### 1.21.1 TK50 Performance Using RSX Utilities

This section describes anticipated timings for various RSX utilities. These are guidelines only; the actual times will vary depending on system load, disk usage, tape ECC errors encountered, and so forth.

- **MOU** - When mounting a TK50 tape, either foreign or as an ANSI tape, the time taken is dependent upon the position of the tape when the mount command is issued. If the tape is at or near the beginning of a track, the expected time for the mount operation is on the order of twenty seconds. During this time the controller performs calibration functions on the tape. If the tape is near the end of a track, the time to mount the tape can increase to as much as two minutes. This time is taken up by the actual rewind of the tape (approximately 1.6 minutes) followed by the calibration functions by the controller. When a cartridge is inserted, it will be at the beginning of tape so the expected time, on the average, for the mount operation will be about twenty seconds. If the tape is left positioned near the end of a track by an abnormal event, for example the system crashes during a tape operation, then this time can approach 2 minutes. However, this is a very rare instance.
- **DMO** - When dismounting a tape, a REWIND command is generally issued to the tape unit as part of the dismount function. Depending on where the tape is positioned, this may take between one second (the tape is at the beginning of a track) and 1.6 minutes (the tape is at the end of a track).

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

- **BRU** - This utility will generally keep the TK50 in streaming mode. The exceptions to this are:
  1. During the initial set up phase, that is writing out the directory information to tape, BRU will not be able to issue I/O commands to the TK50 quickly enough. As a result, the TK50 will run in start/stop mode during this phase of BRU's operation. The time taken for this operation is dependent on the number of directories contained on the input disk. This process can take from one to ten minutes, based on the number of directories written.
  2. BRU generally will not stream if there is a load on the system at the time BRU is run. This load will slow BRU down sufficiently so that it will not be able to issue commands to the TK50 drive fast enough to keep it streaming.
  3. Any use of the disk from which BRU is backing up or restoring will generally cause BRU to run the TK50 in the start/stop mode. The extra disk head movements will add sufficient time to BRU's processing time that it will not be able to issue I/O's to the TK50 controller fast enough to keep it in streaming mode.
  4. BRU will not stream during its /VERIFY pass.
  5. BRU will not stream while it is sorting retrieval pointers. The number of such sort operations is dependent on the degree of disk fragmentation that exists on the input disk.

Once BRU begins copying data blocks out to the TK50, it will keep the TK50 unit in streaming mode provided that none of the conditions described above occur. A test case using a slow disk and 40MB of data was run. The save operation for this took thirteen minutes, with the directory writes taking three minutes of this time. If sufficient data were available for backing up to the tape, BRU would have utilized approximately 83% of the total capacity (94MB) of the tape for storing data. Such a capacity rating would allow the backing up of a 75MB disk ( $0.83 \times 94\text{MB} = 78\text{MB}$ ) to a single TK50 tape cartridge. In this test case, no verify operation was performed. However, the verify operation is estimated to take approximately one hour for this example.

- **BRUSYS** - This utility exhibits the capacity and performance characteristics mentioned above for online BRU.
- **FLX** - This utility will not keep the TK50 streaming. FLX's internal design does not permit the issuing of I/O commands to the TK50 at the rate required in order to keep the tape streaming. Because it does not stream, the padding blocks added by the controller will be over-written during the reposition operation. Tape capacity will not be diminished. A test case using 180 blocks contained in nine files was run. FLX copied the files in 1.8 minutes.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

- PIP - This utility will not keep the TK50 streaming. Its internal design does not permit the issuing of I/O commands to the TK50 at the rate required in order to keep the tape streaming. Because it does not stream, the padding blocks added by the controller will be over-written during the reposition operation. Tape capacity will not be diminished. A test case using 180 blocks contained in nine files was run. PIP, using the TK50 as an ANSI tape, copied the information in 10.5 minutes. This time differs significantly from the FLX test case due to the overhead involved in ANSI tape processing. The default block size on ANSI tape was used for the test case.

There is an optimization that can be performed to increase throughput to an ANSI tape on the TK50 drive. This optimization does not result in streaming; it does result in fewer I/Os to the tape unit and therefore fewer repositions. The size of the block written to ANSI tape can be increased by using the /BS switch in PIP. A value up to 8192. bytes can be specified (the default is 512. bytes). PIP should be installed with an increment if this value is used. If it is not, PIP may issue "not enough buffer space" error messages during certain copy operations to the tape.

### 1.21.2 TK50 Indicator Lights

Because the actual TK50 tape recording surface is hidden from view, it is often difficult to determine what the tape unit is actually doing. There are two lights on the front of the TK50 tape unit that provide some information as to what is happening. A description of these follow:

#### 1. Green indicator light

The green indicator light serves a dual purpose, as follows:

- When the green indicator light is on and does not blink, it indicates that the tape cartridge can safely be removed from the unit.
- When the green indicator light is blinking or not on, it is not safe to remove the cartridge. A blinking pattern indicates that the tape is in motion, either in a forward or reverse direction.

#### 2. Red indicator light

The red indicator light serves a multiple purpose, as follows:

- When the red indicator light is on and does not blink, a tape cartridge is loaded in the drive.
- When the red indicator light blinks slowly, (on for one second and then off for one second) it indicates that the tape is in use and is currently rewinding.
- When the red indicator light blinks rapidly, it indicates that a drive error has occurred. This condition can be cleared by pressing the LOAD/UNLOAD switch twice in succession. Note that this will cause loss of tape context.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.22 I/O DRIVERS

This section describes new features and a restriction for device drivers on RSX-11M-PLUS Version 3.0.

#### 1.22.1 New I/O Driver Features

The following new device driver features are supported:

- Stall I/O for the RC25
- QIO DEUNA driver
- Extended I/O function
- Modified TF.TMO subfunction
- Tape driver functional change
- New disk driver error code

##### 1.22.1.1 Stall I/O for the RC25 -

Stall I/O support for the RC25 has been modified for this release. I/O is stalled only to the fixed disk of the RC25 subsystem. The removable disk will lose context if the drive is spun down. Also, the VER task is no longer used in stalled I/O processing.

Because context may be lost on the removable disk if the subsystem is spun down, all spin-down requests are ignored for the fixed unit of the RC25. For the removable disk unit, you must be privileged in order to spin-down the device when it is dismounted.

When you queue an I/O request to the DU: driver and it cannot be processed because of stall I/O, the following message is printed on the console:

DDnn: - I/O stalled

When the drive has been spun up again and I/O processing can continue, the following message is printed on the console:

DDnn: - I/O resumed

##### 1.22.1.2 RSX QIO DEUNA Driver -

The RSX QIO DEUNA driver allows messages to be sent over the Ethernet by systems without DECnet. To use the DEUNA driver, you issue the QIO\$ macro to the XE: device. The DEUNA driver is compatible with DECnet's Direct Line Access Interface (DLX), which permits easy migration to a DECnet system. New I/O functions have been added to support the QIO DEUNA driver. See Chapter 13 of the RSX-11M/M-PLUS I/O Drivers Reference Manual for more information.



#### 1.22.1.3 Extended I/O Function -

There is a new I/O function, IO.EIO, which allows for new subfunction bits. See Chapter 2 of the RSX-11M/M-PLUS I/O Drivers Reference Manual for a description of IO.EIO.

See Section 1.22.2 for a restriction regarding IO.EIO.

#### 1.22.1.4 Modified TF.TMO Subfunction -

The TMO parameter of the TF.TMO subfunction has been modified so that you can specify the amount of time the driver waits between two input characters before the read is aborted. The amount of time TMO waits is called time-out. The maximum time-out value you can specify is 255(decimal) intervals. If 0 is specified, the read times out immediately after reading any data that may be in the typeahead buffer. If you enter a 0, no time is allowed for you to enter characters, and all characters are read from the typeahead buffer. See the RSX-11M/M-PLUS I/O Drivers Reference Manual for more information.

#### 1.22.1.5 New and Modified Magnetic Tape Driver Information -

The meanings of the following functions have changed:

- Completion of IO.RWD for MUDRV (MU:) devices means that the rewind has been initiated; for MSDRV (MS:) devices it means that the rewind to BOT has been completed.
- IO.DSE (Data Security Erase) is valid only for the TK50 and takes approximately 35 minutes to complete. Once the operation is initiated, it is under the complete control of the TK50 controller. The IO.DSE command cannot be aborted by the host software; the controller ensures that the operation runs to completion.
- IO.SEC (Get Tape Characteristics) has specific changes for TK25 and the TK50.
- Select errors are not issued for MUDRV devices (TK50). If the drive is taken off-line, the drive positions the tape at BOT so the off-line condition is treated as tape "position lost" or "powerfail". The cartridge must be unloaded and loaded in order to access the tape again. This action will result in the tape unit rewinding to BOT. No recovery by the application is possible in such an event. If the tape was mounted as an ANSI tape, the tape context maintained by MTAACP is invalid. The tape must be dismounted and remounted in order to reinitialize the data structures used by MTAACP. If the tape was being accessed in write mode, then the file being written is incomplete and the tape may no longer be in valid ANSI format.
- Read recovery for MSDRV devices is done as follows: Read errors are retried by rereading the block in error a predetermined number of times. For MS: devices (except for TK25), on every eighth reread the block is passed by the tape cleaner blade. If the error persists after a predetermined number of retries the error code IE.VER, is returned.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

- Under certain conditions, if a file is written to a tape mounted /NOLABEL, its block size will be even and one more than the value specified in the MOUNT command.

### 1.22.1.6 New Disk Driver Error Code -

The following new error code has been added:

IE.IFC Invalid function for disk

### 1.22.2 I/O Driver Restriction

The IO.EIO function will not work if your terminal has been set as a remote terminal (RT:) to another system. That is, after you enter the DCL command SET HOST, or MCR command SET /HOST, and log into an RT:, the terminal driver rejects a QIO issuing an extended I/O request from the RT:.

## 1.23 I/O OPERATIONS

This section describes new features and restrictions for I/O operations on RSX-11M-PLUS Version 3.0.

### 1.23.1 New I/O Operation Features

I/O operations support the following new features:

- File specification format expanded
- Logical name parsing
- CSI\$4 command semantic parser
- Changes in parameters for macros
- New offsets in the File Descriptor Block (FDB)
- New bit definition for wildcard processing
- New volume label format
- New file header label (HDR3) format
- Modified keywords for the magnetic tape control task
- Buffer flush routine

#### 1.23.1.1 File Specification Format Expanded -

The format for specifying files on disk and magnetic tape has been expanded for logical name support. See the RSX-11M/M-PLUS and Micro/RSX I/O Operations Reference Manual for more information.

#### 1.23.1.2 Logical Name Parsing -

File Control Services (FCS) supports logical name translation in the FCS .PARSE directive. When the .PARSE directive receives a string, it performs any necessary logical expansion and then parses the resulting string.

Adding logical name support to FCS has caused certain routines to increase in size. An existing task that includes FCS modules in its own address space will increase in size by about 700(octal) bytes. To remove logical name support from FCS, replace the module [1,1]FCSNOLOG.OBS in SYSLIB. You only need to replace the module if you select support for extended logical names, otherwise SYSGEN does this for you.

See the RSX-11M/M-PLUS and Micro/RSX I/O Operations Reference Manual for more information on logical name parsing.

#### 1.23.1.3 CSI\$4 Command Semantic Parser -

The CSI\$4 Command Semantic Parser has been added for logical name support. This routine is the same as the existing CSI\$2 routine, except that it includes extra code to handle logical names. See the RSX-11M/M-PLUS and Micro/RSX I/O Operations Reference Manual for more information.

#### 1.23.1.4 Changes in Parameters for Macros -

The following macros have been modified:

- The FD.PRN parameter for the FDAT\$A macro has been added. This parameter indicates whether the record is preceded by a word containing carriage control information. This value is the print file format attribute.
- The FDOP\$A macro has been modified so that the FA.SHR parameter indicates whether the file should be opened for shared access. Shared access is a precondition for block locking. The logical OR of FA.LKL!FA.EXL can be specified to lock all blocks that are accessed.
- The OPEN\$x macro has been modified so that the FD.RAN parameter requests random access to the file during GET\$ or PUT\$ operations. A PUT\$ operation does not truncate the file. If FD.RAN is not specified FCS uses sequential access by default.

See the RSX-11M/M-PLUS and Micro/RSX I/O Operations Reference Manual for more information.

#### 1.23.1.5 New Offsets In the File Descriptor Block (FDB) -

The following are new FDB offset values:

- **F.EXT** - Address of the FDB extension.
- **F.FLG** - Flag byte

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.23.1.6 New Bit Definition for Wildcard Processing -

A bit definition has been added to the Filename Block Status Word, N.STAT. The bit symbol is NB.WCH. It is set if wildcard processing is required.

### 1.23.1.7 New Volume Label Format -

There is a new volume label format. The accessibility byte (position 11) can be any ANSI "a" character. A space indicates no accessibility restriction. You can specify the "a" character with the /VOLUME ACCESSIBILITY:"c" qualifier in the DCL INITIALIZE command. Any ANSI "a" character is allowed. The default character is a space. The Label Standard Version byte in position 80 contains a 3.

### 1.23.1.8 New File Header Label (HDR3) Format -

There is a new file header label format. The new format contains a system-dependent field in character positions 5 to 68 (64 bytes). The file attributes in the format are specified at creation time. See the RSX-11M/M-PLUS and Micro/RSX I/O Operations Reference Manual for more information.

### 1.23.1.9 Modified Keywords for the Magnetic Tape Control Task -

The following are new keyword definitions for the Magnetic Tape Control task (MAG):

Keyword	Definition
/BS	The number of bytes on a mounted tape or the number of characters (bytes) per block on a mounted tape.
/CC	The type of carriage control. The default is /CC=NONE.
/INITIALIZE	<p>The volume label to which the tape will be initialized.</p> <p>This keyword allows you to create a new volume to satisfy a request from the ACP for a new output volume for an ANSI tape.</p>

### 1.23.1.10 Buffer Flush Routine -

The buffer flush routine (.FLUSH) writes the block buffer to the file being written in record mode. Also, the .FLUSH routine writes file attributes (including F.EFBK and F.HIBK, the end-of-file and high-allocation block numbers) each time the routine is called.

Closing the file guarantees that the block buffer is flushed and that the file attributes are written back to the file header. However, closing and opening a file frequently, to write to the block buffer, results in high system overhead and many disk accesses that hoard system resources. See the RSX-11M/M-PLUS and Micro/RSX I/O Operations Reference Manual for more information.

### 1.23.2 I/O Operations Restrictions

The following restrictions apply to I/O operations:

- A user task record buffer is required for multiple buffering.
- A user task record buffer is required for big buffering.

#### 1.23.2.1 A User Task Record Buffer Is Required for Multiple Buffering

Multiple buffering can improve performance for I/O-bound tasks under certain circumstances. However, multibuffer processing in random mode is not very efficient. When multibuffering in random mode is used, a user task record buffer is always required. If one is not supplied, the task's low memory may be overwritten and the task may then abort.

#### 1.23.2.2 A User Task Record Buffer is Required for Big Buffering -

When using "big" buffering in random mode, a user task record buffer is always required. If one is not supplied, the task's low memory may be overwritten and the task may then abort. See the RSX-11M/M-PLUS and Micro/RSX I/O Operations Reference Manual for more information.

### 1.24 NEW FEATURES FOR USER-WRITTEN DEVICE DRIVERS

This section describes the following new features for user-written device drivers on RSX-11M-PLUS Version 3.0:

- Using asynchronous buffered I/O
- Vectoring for privileged tasks and the Executive
- Converting to vectored access in privileged tasks
- Converting to vectored access in drivers
- Overlapped I/O completion

#### 1.24.1 Using Asynchronous Buffered I/O

Typically, data for input and output requests are transferred directly to and from task memory. To allow the successful transfer of data, the task cannot be checkpointed until the transfer is complete. For most high-speed devices, the transfer occurs quickly enough that a task does not occupy memory for too long a time. For slow-speed devices, however, some mechanism must be available to avoid binding memory to a task for too long a time while the task is performing I/O.

Using the routines \$TSTBF, \$INIBF, and \$QUEBF in the Executive module IOSUB, a driver can execute an I/O request for a slow-speed device. To perform the I/O request, the driver buffers the data in memory allocated to the driver while the task is checkpointed and the I/O request is in progress.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

To test whether a task is in a proper state to initiate I/O buffering, the driver calls the \$TSTBF routine and passes it the address of the I/O packet. By extracting the address of the Task Control Block (TCB) from the I/O packet, \$TSTBF can examine various task attributes. (For example, if the task is checkpointable, buffered I/O can be performed.) Once \$TSTBF has examined the task's attributes it returns to the driver and indicates whether buffered I/O can be performed.

If buffered I/O can be performed, the driver performs two operations. First, it establishes the buffering conditions. For an output request, it copies the task buffers to dynamically allocated pool space. For an input request, it allocates sufficient pool space to receive incoming data.

Second, the driver calls the \$INIBF routine to initiate the I/O buffering. \$INIBF decrements the task I/O count, increments the task's buffered I/O count in T.TIO, and releases the task for checkpointing and shuffling. If the task is currently blocked, the task state is transformed into a stop state until the task is unblocked, or buffered I/O completes, or both. Checkpointing the task is subject to the normal requirements of an active or stopped state as described in the RSX-11M/M-PLUS and Micro/RSX Executive Reference Manual.

After the driver transfers the data, it calls the \$QUEBF routine to queue the buffered I/O for completion. \$QUEBF sets up a Kernel Asynchronous System Trap (KERNEL AST) for the buffered I/O request and, if necessary, unstops the task. When the task is active again, a routine in the Executive module SYSXT notices the outstanding AST and processes it. (If the request is for input, the routine copies the buffered data to task memory.)

This mechanism occurs transparently to the task, thus the name KERNEL AST. The routine then calls the driver to deallocate the buffer from pool. \$IOFIN completes the processing.

### 1.24.2 Vectoring for Privileged Tasks and the Executive

RSX-11M-PLUS Executives allow vectored access to their code by a privileged task. Accessing entry points in a vectored Executive requires that the privileged task be slightly altered to reference these entry points through local vectors in the task. When the privileged task is built, the addresses in these vectors are resolved to an offset in the directive common. At run time, the task resolves the offset to a virtual address by using the directive common.

A vectored access to Executive code provides the following advantages:

- For some systems, space can be saved on distribution kits by distributing common privileged tasks with multiple and different system images.
- In most cases, privileged tasks need not be rebuilt when the Executive is updated.
- In most cases, it allows software sold separately to span multiple versions of RSX systems without relinking the tasks.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

A vectored Executive requires a special directive common in the system. This common is used by the Task Builder when it builds a task and resolves the Executive routine addresses. Each Executive routine that is vectored has a unique fixed offset in the directive common.

Privileged tasks that are built against the dummy symbol table file RSXVEC.STB, have all Executive references resolved as offsets into the special directive common, rather than as virtual Executive addresses. These offsets are translated into virtual addresses at task run time.

For a system that does not support vectoring, the modified task can be rebuilt by using a system-specific RSX11M.STB symbol table file. This will resolve all symbols at task build time. Both RSXVEC.STB and RSX11M.STB are distributed.

Any privileged task that directly reference Executive code must be modified if you want to take advantage of vectoring. An area at the beginning of such tasks should be set aside to store vectors of the Executive entry points that allow the task to address the required Executive locations. Therefore, privileged tasks that take advantage of vectoring will increase in size by approximately one word for each unique Executive reference. The task's vectors in this area contain offsets into the special directive common previously described.

When the task is invoked, a special GIN\$ directive is issued to translate the offsets in the task to virtual addresses available in the directive common. The addresses obtained in the common overwrite the offsets located in the task in memory. The task uses these addresses to reference Executive routines.

The GIN\$ directive is located within the vector directive common; therefore the GIN\$ directive fails on a system that has not been vectored, allowing a vectored task to be rebuilt using a specific RSX11M.STB file and run on that system with no internal code changes.

Additional changes are necessary to make it possible for drivers to be vectored. Drivers, which are mapped through APR5, must use a different scheme because the GIN\$ directive also uses APR5. The driver must be modified to address the entry points through a known fixed low-core memory location (112 octal). This location contains a pointer to SYSCM where the information needed by the driver is located.

### 1.24.3 Converting to Vectored Access in Privileged Tasks

For a task to use vectored entry, a table of entry addresses must be created in the task. A convenient way to do this is to omit the dollar sign from global labels where possible and to omit the period from offset definitions. For example, suppose a privileged task contains a reference to the Executive global data cell \$ACTHD, calls routine \$MPLND, and uses offset definition S.PKT, which is one of the floating data structure offsets.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

The first step in converting a privileged task is to construct a table in the task similar to the example following:

```

;      Executive Entry Point Vector Table

EXEVEC:
        .WORD  0          ; Flag for vector not yet filled
ACTHD:   .WORD  $ACTHD    ;
MPLND:   .WORD  $MPLND    ;
SPKT:    .WORD  S.PKT     ;

EXEVCL=<<.-EXEVEC>/2>

```

The first word of the table is made zero to indicate that the table has not been initialized yet. Each subsequent word of the table is merely a .WORD reference to the desired address. When the privileged task is linked, it must be linked with RSXVEC.STB instead of RSX11M.STB, which provides internal offset values for the symbols.

The second step in converting a privileged task requires that you change all the references to Executive symbols in the task to access those symbols through the vector. Some examples of this process follow:

```

;      Converting Executive references in a privileged task

MOV      $ACTHD,R5          ;; Get address of first TCB
           becomes
MOV      @ACTHD,R5         ;; Get address of first TCB

CALL     $MPLND             ;; Follow redirection list
           becomes
CALL     @MPLND             ;; Follow redirection list

MOV      S.PKT(R3),R0       ;; Get address of first packet
           becomes
ADD      SPKT,R3            ;; Point to I/O queue listhead
MOV      (R3),R0           ;; Get address of first packet

```

The last step is that a GIN\$ directive must be included to perform the translation of the vector. An example section of code is as follows:

```

        .MCALL  GIN$

TRNVEC:  GIN$      GI.VEC,EXEVEC,EXEVCL ; Translate Executive vector

START:   DIR$      TRNVEC                ; Translate Executive vector
        .
        .
        .
        .END      START

```

Before executing the GIN\$ directive, the vector is filled with internal offset definitions, and the first word is 0. The GIN\$ directive replaces each of the offset definitions with the real address of the symbol in the Executive. The GIN\$ directive also fills in the first word of the vector with a 1. If the first word is nonzero when the GIN\$ function is issued, the function is made a NOP. The foregoing procedure allows the GIN\$ directive to be executed any number of times without corrupting the vectors.



## 1.24.4 Converting to Vectored Access in Drivers

Drivers cannot issue a GIN\$ directive. Therefore, a routine is provided that is callable at system state to fill in the vector. Because this routine is at a variable address, some fixed address entry is needed. Location 112 points to a table of information. That table contains one datum, which is the address of the APR bias of the common containing the vectoring routine. The entry point to the routine is offset 4 in that common. An example calling sequence is as follows:

```

;          Callable routine for converting Executive references in a driver

MOV        @ 112,R0          ; Get address of table of entries
MOV        (R0),R0           ; Get address of APR bias, which
                              ; is first word in table
MOV        (R0),KINAR6       ; Map common through I-space APR6
MOV        #EXEVEC,R3        ; Point to vector
MOV        #EXEVCL,R2        ; Specify length of vector
CALL       @#140004          ; Translate the vector

```

## 1.24.5 Overlapped I/O Completion

In general, overlapped I/O completion support causes the execution of the Executive's I/O completion code for each I/O request to be postponed until the next request has been initiated. If I/O requests are in the driver's queue, this action causes the Executive to complete the I/O processing while the physical device services the next request. A minor side effect of this feature is that multiple I/O requests to the same device may complete in an order other than the issued order. This feature is described in the following text.

When a driver requests the Executive to complete the I/O request, the Executive checks the queue of requests to the driver. If the queue is not empty, the Executive defers I/O completion by placing the current completion at the end of the fork list. Control returns to the driver, which assumes that the Executive has completed I/O processing. The driver can then initiate the next I/O operation. After the driver has initiated an I/O operation on the device, the driver returns to the Executive and fork processing begins. Thus, the I/O completion for the previous I/O can be processed to the end. When a hardware I/O operation completes, the driver receives an interrupt and then forks, which always causes the I/O completion to occur after the previously queued completion.

The exception to sequential completion occurs when an I/O operation does not require a hardware operation. In this case, the driver processes the I/O request and then calls the Executive's I/O completion routine. If there is an additional I/O request waiting on the queue, this completion also goes at the end of the fork list, and sequential processing is maintained. Nonsequential completion occurs when the very last request in the queue is a nonhardware-oriented I/O. In this case, that I/O request completes prior to any others waiting for completion. There are many cases of nonhardware-oriented I/O, such as inquiries into device state, or attach and detach requests.

This feature speeds up I/O operation in the case of actual hardware operations because the new hardware I/O is initiated and the transfer may occur in parallel with the final completion of the previous operation. The I/O processing speeds up by the amount of time necessary to process the remaining instructions in the Executive I/O finish routine.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

There is one case where overlapped I/O completion causes I/O requests to finish in an order other than the order in which they were issued. This occurs when the last I/O request queued to the controller does not require a device interrupt to complete.

### 1.25 ERROR LOGGING

This section describes new features, restrictions, and supplementary information for error logging on RSX-11M-PLUS Version 3.0.

#### 1.25.1 New Error Logging Features

The following new error logging features are supported:

- Internal I/O operations
- Non-DIGITAL device
- Error logging control files
- DCL error logging commands
- DCL SHOW ERROR\_LOG command qualifiers
- MCR ELI command switches

##### 1.25.1.1 Internal I/O Operations -

The error logging system supports error logging for internal I/O operations such as data caching.

##### 1.25.1.2 Non-DIGITAL Device -

You no longer need to add a record to the DEVICE\_INFO table in the DEVSM1 module for the error logging system to recognize a user-written device level module. After you write the device level module(s) for your devices, compile the module(s) with the DSP2Pl.SYM file. Next, insert your module(s) in ERRLOG.ULB. The name of a user-written module must be in the following form:

ExxUSR

The letters xx stand for the device mnemonic. Your device mnemonic cannot be the same as any DIGITAL-supplied device mnemonic.

Specify your module name in the MODULE statement as:

MODULE ExxUSR

In your module, you must set the variable INDICATE.TAPE\_FLAG to FALSE if the device you specify is a disk.

If the device you specify is not a disk, set the variable INDICATE.TAPE\_FLAG to TRUE.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

Remember to set your INTERMOD\_DEVERR variables accordingly.

If there is a NOTES module, its name must be in the following form:

NxxUSR

### 1.25.1.3 Error Logging Control Files -

The error logging control files have device-specific information for the following devices:

RX50  
RD51  
RD52  
RD53  
TK50

### 1.25.1.4 DCL Error Logging Commands -

The following is a list of the DCL commands that are used for error logging:

ANALYZE/ERROR_LOG	SET ERROR_LOG
APPEND/ERROR_LOG	SHOW ERROR_LOG
CREATE/CFL	START/ERROR_LOG
MESSAGE/ERROR_LOG	STOP/ERROR_LOG

### 1.25.1.5 DCL SHOW ERROR\_LOG Command Qualifiers -

The DCL command SHOW ERROR\_LOG displays error logging information for the specified device or, if you do not specify a device, displays error logging information for all devices. The SHOW ERROR\_LOG command has the following qualifiers:

/CU[URRENT]

Displays errors that have occurred on all devices since the last time the error logging system was started using the /UPDATE qualifier. This qualifier provides the same functionality as the MCR command ELI/SHOW/CURRENT.

/HI[STORY]

Displays a summary of errors that have occurred on all devices since the last time the error logging system was started using the /ZERO qualifier. This qualifier provides the same functionality as the MCR command ELI/SHOW/HISTORY.

/RE[CENT]

Displays a brief description of errors (in chronological order) that have been recorded by the error logging system. This qualifier provides the same functionality as the MCR command ELI/SHOW/NEW.

#### 1.25.1.6 MCR ELI Command Switches -

The MCR command ELI has the following switches:

**/SH[OW]**

Displays error logging information for the specified device or, if you do not specify a device, displays error logging information for all devices.

**/SH[OW]/CU[RRENT]**

Displays errors that have occurred on all devices since the last time the error logging system was started using the /UP[DATE] switch.

**/SH[OW]/HI[STORY]**

Displays a summary of errors that have occurred on all devices since the last time the error logging system was started using the /ZE[RO] qualifier.

**/SH[OW]/NE[W]**

Displays a brief description of errors (in chronological order) that have been recorded by the error logging system.

#### 1.25.2 Error Logging Restriction

By moving the error logging routines to the Executive common, the following restriction is introduced: if a driver of an error logging device calls the \$CRPKT routine to create an error logging packet, the data address for the data subpacket must not be an address within the driver. Specifically, the address must not be mapped by APR 5, as this APR is used to map the common. Any user-written driver that performs such a function must allocate a piece of pool, fill in the appropriate information, and pass the pool address to the Create Packet Routine.

#### 1.25.3 Supplementary Error Logging Information

This section describes information from the previous version that applies to error logging. Although this information is not new for Version 3.0, it still applies. This section describes the relationship between hard and soft limits.

Error logging allows hard and soft error limits to be reached independently. Previously, reaching one of the limits would disable logging of either kind of error on that device. Now, reaching the soft limit does not affect the logging of hard errors and vice versa.

Device time-outs are logged as hard errors if unrecoverable and as soft errors if recoverable.

#### 1.26 TASK BUILDER

This section describes new features, restrictions, and supplementary information for the Task Builder (TKB) on RSX-11M-PLUS Version 3.0.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.26.1 New Task Builder Features

The following new features are supported for the Task Builder:

- New TKB /SB switch and DCL /SLOW qualifier
- New TKB /CL switch and DCL /CODE:CLI qualifier
- New TKB /FM switch and DCL /CODE:FAST\_MAP qualifier
- FCSRES and FCSFSL change
- TKB /CP replaces /AL
- Creating a task builder with /SB as its default
- STKBLD.BLD procedure

#### 1.26.1.1 New TKB /SB Switch and DCL LINK/SLOW Qualifier -

The Slow Task Builder (STK) is not included separately in the system distribution kit. The Slow Task Builder and the Task Builder are included together in one task image. Use the TKB switch /SB to select the mode of the Task Builder that you want to use.

The following TKB command line for MCR shows the correct placement of the /SB switch:

```
TKB>file.tsk/SB,,=file.obj
```

The following TKB command line for DCL demonstrates the correct placement of the /SLOW qualifier.

```
$LINK/TAS/SLOW/MAP/SYM INPUTFILE
```

The default is /-SB or that /SLOW is not enabled.

#### 1.26.1.2 New TKB /CL Switch and DCL /CODE:CLI Qualifier -

The TKB switch /CL or DCL qualifier LINK/CODE:CLI informs the Task Builder that the task is a Command Line Interpreter (CLI). You can then install a CLI without specifying CLI=YES. Use this switch when you task build the DCL task or any other CLI task. You can still install a CLI built without the /CLI switch by specifying CLI=YES when installing it. (Note that the Fast Task Builder (FTB) does not support the /CL switch or /CODE:CLI qualifier.)

The following TKB command line for MCR demonstrates the correct placement of the /CL switch:

```
TKB>file.tsk/CL,,=file.obj
```

The following TKB command line for DCL demonstrates the recommended placement of the /CODE:CLI qualifier:

```
$LINK/TAS/CODE:CLI/MAP/SYM INPUTFILE
```

The default is /-CL or that /CODE:CLI is not enabled.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.26.1.3 New MCR /FM Switch and DCL /CODE:FAST\_MAP Qualifier -

The TKB switch /FM or DCL qualifier /FAST\_MAP allow space for fast mapping. This switch or qualifier informs the Task Builder that space must be allocated in memory between the task and the external header for use by the fast-mapping feature of the Executive.

The /FM switch or /CODE:FAST\_MAP qualifier corresponds to the INSTALL command qualifier /FMAP=YES. Note that the Fast Task Builder (FTB) does not support the /FM switch or /FAST\_MAP qualifier.

The following TKB command line for MCR shows the correct placement of the /FM switch:

```
TKB>file.tsk/FM,,=file.obj
```

The following TKB command line for DCL shows the recommended placement of the /CODE:FAST\_MAP qualifier:

```
$LINK/TAS/CODE:FAST_MAP/MAP/SYM INPUTFILE
```

The default is /-FM or that /CODE:FAST\_MAP is not enabled.

### 1.26.1.4 FCSRES and FCSFSL Change -

FCSRES and FCSFSL are merged into a single vectored-entry memory image that can be used in either user- or supervisor-mode libraries. This reduces both disk and memory space requirements. The [1,1]FCSRES.TSK image file installs under the library name FCSRES and is used to satisfy both user and supervisor library requests.

Existing tasks that reference FCSRES are unaffected by this change and need not be rebuilt except to use new functionality (for example, the new logical name parser, CSI\$4). To use the new library, you must rebuild existing tasks that reference FCSFSL, whether they reference FCSFSL directly or by referencing a library (such as F77RES) that has been built to reference FCSFSL.

The FCS resident library image ([1,1]FCSRES.TSK) has been built containing the supervisor-mode library completion routine. However, because the user-mode FCSRES library is a memory-resident overlaid library, it must be distinguished from the supervisor-mode library usage (because the completion routine cannot be overlaid). Thus, the files for FCSFSL must be used to build tasks using supervisor-mode (the .TSK file is needed for information contained in the label block; the .STB file is needed for symbol values and overlay structure).

To supply the two different descriptions but use the same library image, the Task Builder has been changed to force references to FCSFSL to become FCSRES references in the resulting executable task image. This is also true for the Fast Task Builder (FTB). In other words, the build commands for both codes remain the same as they have been (LIBR=FCSRES or SUPLIB=FCSFSL), and files (both .TSK and .STB) for both remain in [1,1] (although the FCSFSL.TSK file size is considerably reduced).

Note that existing tasks referencing FCSFSL can continue to use the previous version of FCSFSL until they are rebuilt, but they cannot use the new image file supplied under the name [1,1]FCSFSL.TSK because this image does not contain executable library code. Also, when tasks specifying FCSFSL are built with the modified Task Builder, they are forced to use the new, merged FCSRES image.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

There is one additional consequence of this merge: the new image can generate a non-overlaid user-mode reference to FCSRES for tasks having sufficient virtual address space available. This new mode results in smaller task root code (from reduced or eliminated overlay RTS support requirements) and faster task execution (from eliminating overlay RTS calls). To use the image in this new way, build the referencing task to specify the FCSFSL library files but through a user mode reference (LIBR=FCSFSL).

The possible references and the results are as follows:

TKB Option	Library Specification	Result
LIBR=	FCSRES	Same as existing user-mode FCSRES (PIC, memory-resident overlaid, uses one APR)
LIBR=	FCSFSL	New, user-mode nonoverlaid FCSRES requires two APRs
SUPLIB=	FCSFSL	Supervisor-mode FCSRES usage (syntax and functionality not changed; two APRs; was absolute - now PIC)
SUPLIB=	FCSRES	Invalid - completion routine cannot be overlaid

### 1.26.1.5 TKB /CP Replaces /AL -

The Task Builder /CP (/CHECK:SYSTEM) switch has been substituted for the /AL (/CHECK:TASK) switch in the SYSGEN.BLD files for the following tasks:

HRC	MCD	SYL
HEL	BYE	TKN
FCPLRG	SAV	SHF
SHU	INS	PMT

The reason for this substitution is that external task header support is automatically included in the full-functionality Executive option, which most users select. Tasks with external headers can be checkpointed only to a system checkpoint file. The /AL switch, however, allocates space within the same task image; this space is never used by tasks with external headers. The /CP switch makes a task eligible for system checkpointing, thus eliminating the checkpoint space that the /AL switch had allocated within the task image.

### 1.26.1.6 Creating a Task Builder with /SB as Its Default -

On the RL02 pregenerated distribution kit, a command file is provided that is named LB:[1,2]MAKESTK.CMD. The command procedure creates a version of Slow Task Builder (STK) in LB:<LIBUIC>. The command procedure accepts a parameter that determines whether the FCSRES library or the FCSFSL library is used. You can supply RES, FSL, or no parameter.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

If you supply RES, MAKESTK.CMD copies the TKBRES.TSK file (the latest version of the Task Builder on your system) into STKRES.TSK. This Task Builder uses the FCS resident library to resolve the symbols in the FCS routines that the Task Builder uses.

If you supply FSL, MAKESTK.CMD copies the TKBFSL.TSK file (the latest version of the Task Builder on your system) into STKFSL.TSK. This Task Builder uses the supervisor-mode version of the FCS resident library to resolve the symbols in the FCS routines that TKB uses. Only the RL02 kit for I- and D-space contains FCSFSL.

If you supply no parameter, MAKESTK.CMD copies the TKB.TSK file into STK.TSK. This Task Builder contains the FCS routines that the Task Builder uses.

MAKESTK.CMD places the requested version of the Task Builder in LB:<LIBUIC>. Then, using a ZAP command, MAKESTK.CMD changes the TKB default from /-SB or not enabling /SLOW, to /SB or /SLOW.

### 1.26.1.7 STKBLD.BLD Procedure -

You can invoke a command procedure called STKBLD.BLD during system generation. STKBLD.BLD creates the Task Builder .CMD and .ODL files. The distributed Task Builder on the system uses these files to build one of the following files with /SB as the default:

STK.TSK  
STKRES.TSK  
STKFSL.TSK

### 1.26.2 Task Builder Restrictions

The following restrictions apply to the Task Builder:

- Map supervisor-mode libraries at address 0.
- Do not use LINK /SLOW with indirect command files.
- Only referenced symbols result in autoload vectors.
- The first library specified must be first library entered.
- Base address displayed is incorrect.
- Do not cluster read-only and read/write libraries.
- You should use the /SS switch with RSX11M.STB.

#### 1.26.2.1 Map Supervisor-Mode Libraries At Address 0 -

A Supervisor-mode library must be mapped at virtual address 0 if a supervisor-mode library is used.



**1.26.2.2 Do Not Use LINK /SLOW With Indirect Command Files -**

The LINK /SLOW qualifier does not function when used with an indirect command file. If you invoke the Task Builder with an indirect command file, you will have to accept the use of the standard Task Builder or add the /SB switch in the indirect command file.

**1.26.2.3 Only Referenced Symbols Result in Autoload Vectors -**

Autoload vectors supplied by the symbol table (.STB) files of the resident libraries are selectively included in the user's task image. Only referenced symbols result in autoload vectors that are present in the task image.

**1.26.2.4 The First Library Specified Must Be First Library Entered -**

The first library specified in the CLSTR option should be the first library entered by the task. If a memory-resident overlaid library has been built with a null root, the install process merely checks for the presence of the required libraries but does not map to them. When the task executes, the first library entered becomes the default library, regardless of the order in which the libraries are specified in the CLSTR option statement.

If the first cluster element specified in the CLSTR statement is not the first library entered and that library uses the stack for parameter passing, the information passed between the cluster library elements and the overlay runtime system becomes corrupted, which results in unpredictable behavior of the executing task.

**1.26.2.5 Base Address Displayed Is Incorrect -**

A non-PIC shared region's base address is displayed in the map as zero. The base address is not zero, but has a true base address. This problem is a map-generation problem of the Task Builder.

**1.26.2.6 Do Not Cluster Read-Only and Read/Write Libraries -**

Read-only and read/write libraries cannot be clustered together. This form of clustering is not supported.

**1.26.2.7 You Should Use the /SS Switch with RSX11M.STB -**

When you use the RSX11M.STB file (the Executive symbol definition file) as an input file to TKB, you should always append the /SS switch to the file specification. The .STB file contains so many symbols that, potentially, TKB could exhaust its virtual memory tables.

Explicitly include on the command line the required library modules before specifying RSX11M.STB.

### 1.26.3 Supplementary Task Builder Information

This section describes information from the previous version that applies to the Task Builder. Although this information is not new for Version 3.0, it is still valid. This section describes the following topics:

- Two forms of symbol definition in the .STB file
- I- and D-space task Autoload vectors
- I- and D-space task disk block allocation
- Segment descriptor block size

#### 1.26.3.1 Two Forms of Symbol Definition in the .STB File -

The symbol table file (.STB) contains two forms of symbol definition. To maintain backward compatibility, all autoloadable symbols are entries in the global symbol directory, and the vector itself is defined in associated text records. Additionally, the .STB file contains a new internal symbol directory of autoloadable symbols for conventional tasks, as well as the information needed to generate Autoload vectors for I- and D-space tasks.

#### 1.26.3.2 I- and D-Space Task Autoload Vectors -

For I- and D-space tasks (user mode), the Autoload vectors consist of two parts:

- An I-space part consisting of 4 words contained in the program section \$\$ALVI
- A D-space part consisting of 2 words contained in the program section, \$\$ALVD

#### 1.26.3.3 I- and D-Space Task Disk Block Allocation -

Disk space allocation for I- and D-space overlay segments is large enough to accommodate the I-space part and the D-space part in separate but adjacent disk blocks. The I-space part comes first on disk, and the D-space part comes second. When an overlay segment is read into memory, the I- and D-space parts are read separately. However, the speed with which I- and D-space parts are read into memory is increased over what would be normal for two separate segments because these parts are adjacent on the disk.

#### 1.26.3.4 Segment Descriptor Block Size -

The size of the segment descriptor block that is internal to TKB depends on whether an I- and D-space task is being built. For a conventional task, the size of the internal segment descriptor is 230(octal) bytes. For an I- and D-space task, the size is 262(octal) bytes.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.27 LAYERED PRODUCTS RESTRICTIONS

The following restrictions apply to layered products on RSX-11M-PLUS Version 3.0:

- Command files containing SET /UIC commands
- FMS-11

#### 1.27.1 Command Files Containing SET /UIC Commands

Because of support for named directories, the DCL command SET DEFAULT/NONAMED or MCR command SET /NONAMED should be used before running any command files that use the SET /UIC command.

#### 1.27.2 FMS-11

FMS-11 Version 1.0 does not have named directory support in the FED and FUT utilities. FMS-11 Version 2.0 will include named directory support and this will no longer be a restriction.

### 1.28 MACRO-11

This section describes new features and supplementary information for MACRO-11 on RSX-11M-PLUS Version 3.0.

#### 1.28.1 New MACRO-11 Features

The following new MACRO-11 features are supported:

- Support for logical names
- Corrections to the MACRO-11 Version 5.3 assembler

##### 1.28.1.1 Support for Logical Names -

MACRO-11 fully supports RSX logical names by calling the .CSI4 SYSLIB parsing routine.

##### 1.28.1.2 Corrections to the MACRO-11 Version 5.3 Assembler -

The following corrections have been made to the MACRO-11 Version 5.3 assembler:

- Previous versions of MACRO-11 would hang in an infinite loop if they encountered a record with an invalid record size. That problem has been fixed.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

- MACRO-11 did not mark symbolic expressions as complex when they contained a symbol from a relocatable program section and a symbol from an absolute program section. That resulted in incorrect linker output if the base of the absolute program section was not zero. Those symbolic expressions are correctly marked as complex.
- MACRO-11 did not mark symbolic expressions as complex when they contained symbols from different absolute program sections. That resulted in incorrect linker output if the base of either program section was not zero. Those symbolic expressions are correctly marked as complex.
- When MACRO-11 directly assigned the current location counter symbol "." to a global symbol in an absolute program section, MACRO-11 incorrectly bound the global symbol to the .ABS program section. MACRO-11 correctly binds the global symbol to the absolute program section in which the assignment occurred.
- If MACRO-11 encountered a label containing invalid characters, MACRO-11 would hang in an infinite loop if there existed a macro with the same name as the valid part of the label name. MACRO-11 correctly returns an error.

### 1.28.2 Supplementary MACRO-11 Information

This section describes information from the previous version that applies to MACRO-11. Although this information is not new for Version 3.0, it is still valid. This section includes the following topics:

- Version 5.2 RSX changes
- Use of colon in .ASCII and .ASCIZ strings
- MCS support
- Version 5.1 RSX-specific changes
- Corrections to the Version 5.1 assembler
- Version 5.0 RSX-specific changes
- Corrections to the Version 5.0 assembler

1.28.2.1 Version 5.2 RSX Changes - There were no RSX-specific changes made to MACRO-11 V5.2.

#### 1.28.2.2 Use of Colon in .ASCII and .ASCIZ Strings -

MACRO-11 does not allow the colon (:) character as a delimiter for .ASCII or .ASCIZ strings. This is documented in Chapter 6 of the PDP-11 MACRO-11 Language Reference Manual.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.28.2.3 MCS Support -

MACRO-11 Version 5.2 provided support for the 8-bit DEC Multinational Character Set (MCS). See Appendix A of the PDP-11 MACRO-11 Language Reference Manual for a table on MCS.

The following table lists the directives that support the MCS. The corresponding section numbers are locations in the PDP-11 MACRO-11 Language Reference Manual where you can access information about each directive.

Macro	Section
.ASCII directive	6.3.4
.ASCIIZ directive	6.3.5
.ERROR directive	7.5
.IF directive	6.9.1
.IF DIF	
.IF IDN	
.IFF directive	6.9.2
.IFF DIF	
.IFF IDN	
.IRP directive	7.6.1
.IRPC directive	7.6.2
.NCHR directive	7.4.2
.PRINT directive	7.5
.REM directive	6.1.6
.SBTTL directive	6.1.3
.TITLE directive	6.1.2

See the following section numbers in the PDP-11 MACRO-11 Language Reference Manual for further information on the 8-bit DEC Multinational character set:

Section	
2.2.4	Comment field
6.3.3	ASCII conversion characters
7.3	Arguments in macro definitions and macro calls
7.3.6	Keyword arguments

### 1.28.2.4 Version 5.1 RSX-Specific Changes -

- Previous versions of MACRO-11 would exit with SUCCESS exit status even though errors were reported. That problem has been fixed.
- If MACRO-11 detected an I/O error while reading a command file, MACRO-11 would produce an odd-address trap. Now, MACRO-11 reports the error message "MAC -- Command I/O error".

### 1.28.2.5 Corrections to the Version 5.1 Assembler -

The following corrections have been made to the MACRO-11 Version 5.1 assembler:

- MACRO-11 Version 5.1 processed some index-deferred arguments as floating-point numbers by default. Now, MACRO-11 processes all index-deferred arguments as octal by default.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

- MACRO-11 did not mark internal displaced relocatable statements as relocatable with an apostrophe (') in the assembly listing. They are now marked correctly.
- MACRO-11 set bit 3, an unused bit, in all .PSECT object records. MACRO-11 no longer sets bit 3. That change makes object files created with the new version of MACRO-11 different from object files created with previous versions of MACRO-11. As a result, they will have different PAT checksums, and a binary comparison of the files will show differences. However, the resulting task or .SAV image files will be the same.

### 1.28.2.6 Version 5.0 RSX-Specific Changes -

- The cross-reference options SEC and ERR have been added.

#### NOTE

The RSX-11 Cross-Reference Processor (CRF) has been updated to include support for these two new macro cross-reference options. Only the new RSX-11 CRF version (Version 2) distributed with RSX-11M Version 4.1 and RSX-11M-PLUS Version 2.1 should be used with this version of MACRO-11.

- The default for the command line option `/[-]SP` has been modified from `/SP` to `/-SP`. The new default may be modified by the system manager using the `TKB GBLPAT` option described in the MACRO-11/RSX task build command file.

### 1.28.2.7 Corrections to the Version 5.0 Assembler -

- The op code `CALLR addr` (Call-Return) has been added to the permanent symbol table (PST). This op code is equivalent to the `JMP addr` op code. The `CALLR addr` op code was added to complement the `CALL addr` op code, which is equivalent to the `JSR PC,addr` op code.
- The previous version of MACRO-11 used a range of 64\$ to 127\$ for automatic local symbol generation. Now, MACRO-11 uses a range of 30000\$ to 65535\$ when generating local symbols.
- Most assembler-generated listing text is now in upper/lower case. This change was made to increase the readability of MACRO-11 code. Lines of code that include the `.SBTTL` or the `.TITLE` directive are not converted to uppercase.
- Lines of code that include the `.SBTTL` directive are listed in the table of contents of an assembly listing, even if an `.NLIST` statement is in effect at the time the `.SBTTL` lines are encountered. You may specify the `.NLIST` directive with the `TOC` argument to prevent the table of contents from being printed.

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

- The symbol table is printed at the end of an assembly, even if the .NLIST directive is in effect. You may specify the .NLIST directive with the SYM argument to prevent the symbol table from being printed.
- All page headers include the day of the week.
- The assembler statistics information that appears at the end of the assembly listing file has been updated to include the following additional information:
  - Total number of virtual work file reads
  - Total number of virtual work file writes
  - Maximum amount of virtual memory used (in words and pages)
  - Size of physical memory free space (in words and pages)
  - Operating system and environment that the assembler is running under
  - Total elapsed assembly time
  - MACRO-11 command line
- The .PSECT synopsis that is printed in the listing file, after the symbol table, includes the program section attributes.
- The maximum number of relocatable terms in a complex expression has been changed. The maximum size of an .OBJ record that MACRO-11 can produce was increased from 42(decimal) bytes to 128(decimal) bytes.

Do not compare .OBJ files that have been created by different versions of MACRO-11 when verifying whether your code generation is correct. Changes that have been made for this version of MACRO-11 (mentioned above) will invalidate a direct comparison of assembler .OBJ output. Verify code generation by linking or taskbuilding the .OBJ files involved and then comparing the .SAV or the .TSK image files.

### NOTE

Because the .OBJ files produced by this version of MACRO-11 are different, users of the PAT (Object Module Patch Utility) are warned that checksums must be recomputed on any object patches assembled with this version of MACRO-11.

- The default for the LC argument has been changed from .DSABL LC to .ENABL LC.
- The following .ENABL/.DSABL options have been added:
  - .ENABL LCM/.DSABL LCM
  - .ENABL MCL/.DSABL MCL

## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

- The following directives have been added to MACRO-11. These directives are documented in the PDP-11 MACRO-11 Language Reference Manual.

.CROSS  
.INCLUDE  
.LIBRARY  
.MDELETE  
.NOCROSS  
.REM  
.WEAK

### 1.29 DECMAIL-11

This section describes a new feature and restrictions for DECmail-11 on RSX-11M-PLUS Version 3.0.

#### 1.29.1 New DECmail-11 Feature

DECmail-11 supports the use of named directories in addition to UICs for folder names, distribution lists, batch control files and other file specifications. UICs will still be required in the user name file (NAMES.DAT), used as input to NAMES.TSK, which controls the registration of mail users on your system.

#### 1.29.2 DECmail-11 Restrictions

The following restrictions apply to DECmail-11:

- Extended logical names not supported
- New DECmail-11 installation procedure

##### 1.29.2.1 Extended Logical Names Not Supported -

DECmail-11 Version 2.0 does not support the use of extended logical names in file specifications. While using logical names will work in some cases, their use should be avoided, especially in cases where the logical name is longer than the corresponding physical name. Also, the use of the underscore character ( \_ ) to indicate a physical device rather than a logical device of the same name, will not work. The logical name will be used instead of the physical device name.



## RSX-11M-PLUS SOFTWARE FEATURES AND RESTRICTIONS

### 1.29.2.2 New DECmail-11 Installation Procedure -

Several changes have required that a new installation command file be included with Update A. You must use this new installation command file in place of the version provided in the distribution kit. For information regarding use of the new procedure, please refer to DECMAIL.DOC included on the Update A kit.



## CHAPTER 2

### CORRECTIONS TO DOCUMENTATION

This chapter corrects errors and omissions in the RSX-11M-PLUS documentation. The section titles in this chapter are the titles of manuals that require correction.

#### 2.1 RSX-11M-PLUS SYSTEM GENERATION AND INSTALLATION GUIDE

This section contains a note regarding documentation that has been moved and a correction to an error.

##### 2.1.1 SYSGEN Questions Removed

The following SYSGEN questions are no longer asked. They are documented as being asked in Section 3.2.2.

CE122      Do you want host support for LAT terminal servers?

CE254      Do you want terminal driver extended I/O support?

These features are supported. However, you must have DECnet support for LAT support to function.

##### 2.1.2 Update Procedure

The Update procedure which was in the RSX-11M-PLUS Update Installation Guide and Update Notes, is described in Chapter 2 of the RSX-11M-PLUS System Generation and Installation Guide.

#### 2.2 RSX-11M-PLUS COMMAND LANGUAGE MANUAL

This section corrects errors and omissions in the RSX-11M-PLUS Command Language Manual. These corrections are as follows:

- SHOW DEVICES command format
- Description of RUN/COMMAND
- Additions to qualifiers
- Corrections to qualifier descriptions
- Miscellaneous errors

## CORRECTIONS TO DOCUMENTATION

- Additional task status flags
- Additional error message

### 2.2.1 SHOW DEVICES Command Format

In Section 5.13.3, the correct syntax for the SHOW DEVICES command is as follows:

```
SHOW DEVICES[/attribute] [dd[nn:]]
```

The parameter dd[nn:] is the specific device or the type of device that you want to examine. The /dd[nn:] qualifier is not a valid qualifier.

### 2.2.2 Description of RUN/COMMAND

In Section 7.2.1, the description for the DCL command RUN/COMMAND is incorrect. The description should read as follows:

```
RUN/COMMAND:"taskcommand"
```

Passes the specified command line to the task you are running. The command must begin with the task's acronym and it must be valid for the task or a syntax error will occur. Also the command must be inside the quotation marks (") and not more than 40 characters long. For example, the following command:

```
$ RUN/COMMAND:"PIP /LI" $PIP (RET)
```

runs PIP and then passes the /LI switch to it. The result is a directory listing.

When the task has finished executing the command line, the task is removed.

### 2.2.3 Additions to Qualifiers

The following qualifiers are missing from the Quick Reference Section of Chapter 9:

- DEFINE/FINAL
- DEFINE/TRANSLATION\_ATTRIBUTE=TERMINAL
- HELP/LOCAL
- SET TERMINAL/MCR
- SHOW TERMINAL/MCR

## CORRECTIONS TO DOCUMENTATION

### 2.2.4 Corrections to Qualifier Descriptions

The following qualifiers are incorrectly described in the Quick Reference Section of Chapter 9:

- DELETE/[NO]CONFIRM  
/[NO]CONFIRM is a synonym for /[NO]QUERY.
- INITIALIZE/UPDATE/DENSITY:arg  
The argument is either HIGH or LOW.
- INSTALL/EXTENSION:n  
The argument n is decimal.
- LINK/CODE:[NO]FPP  
FPP is the default argument.
- MOUNT/WINDOW:arg  
The three arguments are: n, (USER:n, INDEX:n), and FULL
- PRINT/[NO]WIDE  
/[NO]WIDE is not a valid qualifier.
- RUN/EXTENSION:n  
The argument n is decimal.

### 2.2.5 Miscellaneous Errors

Correct the following miscellaneous errors in the RSX-11M-PLUS Command Language Manual:

- In Section 4.8.2 - DELETE, the /[NO]CONFIRM qualifier is missing. It is a synonym for /[NO]QUERY.
- In Section 4.10.1 - PRINT, the /[NO]WIDE qualifier is not a valid qualifier.
- In Section 5.9 - MOUNT, the density specified with the /DENSITY qualifier cannot be altered; it can only be checked using INITIALIZE/UPDATE/DENSITY.
- In Section 5.10 - DISMOUNT, the /[NO]UNLOAD qualifier applies only to magnetic tape devices.
- In Section 5.11.1 - INITIALIZE/UPDATE, the correct arguments for the /DENSITY qualifier are HIGH and LOW. /DENSITY does not alter the density value in the Volume Home Block, but checks the density value established when the volume was initialized.
- In Section 5.13.3 - SHOW DEVICES, the correct syntax for the SHOW DEVICES command is as follows:

SHOW DEVICES[/attribute] [dd[nn:]]

The parameter dd[nn:] is the specific device or the type of device that you want to examine. The /dd[nn:] qualifier is not a valid qualifier.

## CORRECTIONS TO DOCUMENTATION

- In Section 6.5.1 - LINK, the /CODE:FPP argument should be /CODE:[NO]FPP. The FPP argument is the default.
- In Section 8.1.3 - SET SYSTEM, the /NETWORK\_UIC qualifier has the following argument: :[directory]. You need this argument to specify the directory in which all the DECnet-related tasks are stored. The brackets are required syntax.

### 2.2.6 Additional Task Status Flags

In Section 7.14.3.1, add the following task status flags to Table 7-2:

NRP	TS.NRP	Mapped to non-resident partition
RUN	TS.RUN	Running on another processor

Also, the status flag TS.CHK, should be T2.CHK; and the status flag, T3.RDN should be TS.RDN.

### 2.2.7 Additional Error Message

Add the following error message to Chapter 10:

yyy -- Destination expected

**Explanation:** You did not specify the destination parameter in the command line.

**User Action:** Reenter the command line after checking for proper syntax.

## 2.3 RSX-11M/M-PLUS MCR OPERATIONS REFERENCE MANUAL

This section corrects an error in the RSX-11M/M-PLUS MCR Operations Reference Manual.

In Chapter 3, the description of the /BAD=[option] keyword for the MCR command INI[TVOLUME] is incorrect. The correct description follows:

To prevent bad blocks from being allocated to files in a volume, first run the Bad Block Locator Utility (BAD). BAD tests volumes for the number and location of bad blocks. In this way, known bad blocks are not allocated to any other file.

The way in which INI creates BADBLK.SYS depends upon the input it receives from the BAD utility. In turn, the data generated by BAD differs according to the type of device it is testing. On non-last-track devices, BAD records the addresses of bad blocks on the last good block of the device. This list of bad block addresses is called the Bad Block Descriptor File. INI then uses the Bad Block Descriptor File to create BADBLK.SYS. However, on last-track devices, the last track can contain a Manufacturer's Detected Bad Sector File (MDBSF), and a Software Detected Bad Sector File (SDBSF). BAD writes a record of bad blocks to the SDBSF. INI then creates BADBLK.SYS by combining the input from the MDBSF and the SDBSF.

## CORRECTIONS TO DOCUMENTATION

If you want BAD to treat a last-track device as a non-last-track device, specify the /OVERRIDE switch in the BAD command line. In response to the /OVERRIDE switch, BAD writes a Bad Block Descriptor File on the last good block before the last track. Then, when you initialize the volume, you must also specify the /BAD keyword with the [OVR] option (INI /BAD=[OVR]), so that INI can locate the Bad Block Descriptor File and use it to create BADBLK.SYS.

If you do not specify the /BAD keyword with the INI command, the default action of the command is /BAD=[AUTO]. That is, INI automatically performs bad block processing. The other options of the /BAD keyword allow you to modify the default action of the command.

### 2.4 RSX-11M/M-PLUS INDIRECT COMMAND PROCESSOR MANUAL

This section corrects omissions and errors in the RSX-11M/M-PLUS Indirect Command Processor Manual. These corrections are as follows:

- <SYSTEM> symbol value
- Invalid condition for .ONERR

#### 2.4.1 <SYSTEM> Symbol Value

In Section 2.4.1.2, page 2-19, add the following statement:

The special symbol <SYSTEM> will have a value of 5 if Indirect is running on a VMS host under VAX-11 RSX.

#### 2.4.2 Invalid Condition for .ONERR

In Section 2.6.22, page 78, add the following statement:

For the .ONERR directive, the first item in the list of error conditions is not a valid condition. This item should be as follows:

Task not installed in system (.XQT, .WAIT)

#### 2.4.3 .ASK Time-out Values

Sections 2.5.2, 2.6.3, and 2.6.4 include ticks as a valid time-out specification. This is incorrect.

## CORRECTIONS TO DOCUMENTATION

### 2.5 RSX-11M/M-PLUS AND MICRO/RSX EXECUTIVE REFERENCE MANUAL

This section corrects omissions and errors in the RSX-11M/M-PLUS and Micro/RSX Executive Reference Manual. These corrections are as follows:

- Parameter list for CALL RCTLON and CALL RCTLOG
- Parameter list for RLON\$ and RLOG\$
- Macro expansion for the RLON\$ directive
- Parameter list for CALL TRALON and CALL TRALOG
- Parameter list for TLON\$ and TLOG\$
- Macro expansion for the TLON\$ directive

The following corrections apply to both the FORTRAN and Macro calls.

#### 2.5.1 Parameter List for CALL RCTLON and CALL RCTLOG

The parameter list for CALL RCTLON and CALL RCTLOG should be as follows:

(mod,itbmsk,[status],lns,lnssz,iens,ienssz,[rsize],[rtbmod],[idsw])

#### 2.5.2 Parameter List for RLON\$ and RLOG\$

The parameter list for RLON\$ and RLOG\$ should be as follows:

mod,[tbmsk],[status],lns,lnssz,ens,enssz,[rsize],[rtbmod]

#### 2.5.3 Macro Expansion for the RLON\$ Directive

The first line of the macro expansion for the RLON\$ directive should read as follows:

RLON\$ MOD,TBMSK,STATUS,LNS,LNSSZ,ENS,ENSSZ,RSIZE,RTBMOD

The rest of the expansion is correct.

#### 2.5.4 Parameter List for CALL TRALON and CALL TRALOG

The parameter list for CALL TRALON and CALL TRALOG should be as follows:

(mod,tbmsk,[status],lns,lnssz,ens,ienssz,[rsize],[rtbmod],[idsw])

#### 2.5.5 Parameter List for TLON\$ and TLOG\$

The parameter list for TLON\$ and TLOG\$ should be as follows:

mod,tbmsk,[status],lns,lnssz,ens,enssz,[rsize],[rtbmod]



## CORRECTIONS TO DOCUMENTATION

### 2.5.6 Macro Expansion for the TLON\$ Directive

The first line of the macro expansion for the TLON\$ directive should read as follows:

```
TLON$ MOD,TBMSK,STATUS,LNS,LNSSZ,ENS,ENSSZ,RSIZE,RTBMOD
```

The rest of the expansion is correct.

### 2.6 RSX-11M/M-PLUS SYSTEM MANAGEMENT GUIDE

In the description of the RMDemo D page, the value for the last line is incorrect. The statistic for write % deferred (last line) will always be zero.

### 2.7 RSX-11M/M-PLUS AND MICRO/RSX DEBUGGING REFERENCE MANUAL

This manual' combines the IAS/RSX-11 ODT Reference Manual and information about XDT. Information specific to IAS has been deleted.

The RSX-11M, RSX-11M-PLUS, and Micro/RSX Executives all contain code that detects certain types of internal system corruption. If XDT is included in the system, the Executive attempts to enter XDT as soon as the system corruption is detected. XDT on RSX-11M-PLUS systems and loadable XDT use bug checks to report this type of error. This manual includes information on interpreting bug checks.

### 2.8 RSX-11M/M-PLUS BATCH AND QUEUE OPERATIONS MANUAL

This section corrects omissions and errors in the RSX-11M/M-PLUS Batch and Queue Operations Manual. These errors and omissions are as follows:

- SUBMIT command format
- /[NO]TRANSFER qualifier description
- Batch log information

#### 2.8.1 SUBMIT Command Format

In Section 3.7, page 3-15, the MCR format for the SUBMIT command is unclear in that a place for specifying the MCR batch log file switches is omitted. The format should be as follows:

```
MCR> SUBMIT [queue name:][job name][ /job switch[s] ][logfile-  
switch[es]]=filespec[s] [/file switch(es)]
```

Note that all the logfile switches require a preceding slash (/) except the SUB jobname= switch.

## CORRECTIONS TO DOCUMENTATION

### 2.8.2 /[NO]TRANSFER Qualifier Description

In Section 2.2, page 2-6, the description of the PRINT command's qualifier /[NO]TRANSFER, does not mention that when a copy of a file is transferred from a private device and then printed, the copy of the file is deleted. The original file is not deleted from the private device.

### 2.8.3 Batch Log Information

On page 3-19, replace the second and third paragraphs with the following:

The log file includes the commands in the batch chain, the time they were executed, the error messages received, any comments and optionally login messages, and the data blocks for the job. The log also includes all system output that would normally appear on your terminal during an interactive session.

The log file print job contains the log file, as well as any spooled output or maps appended to the print job. The log file print job is printed with the default PRINT command qualifiers used for the batch log file.

If you specify the /NOLOG or /NOPRINT qualifier, there will be no log file print job. Therefore, any output, listings, or maps will be spooled as separate print jobs, each with its own PRINT command qualifiers.

## 2.9 RSX-11M/M-PLUS UTILITIES MANUAL

This section corrects errors and omissions in the RSX-11M/M-PLUS Utilities Manual. Utilites requiring correction are presented here in alphabetical order.

### 2.9.1 BRU

This section corrects errors and omissions in the Backup and Restore Utility (BRU) chapter of the RSX-11M/M-PLUS Utilities Manual. These corrections are as follows:

- Indirect command files
- Wildcards in input specifications
- /NOSUPERSEDE qualifier description
- /VERIFY qualifier description
- Changes in Stand-alone BRU
- Tape write error message
- MANUAL option

## CORRECTIONS TO DOCUMENTATION

### 2.9.1.1 Indirect Command Files -

Add the following to Section 7.0, page 7-1:

You can execute an indirect command file containing BRU commands from BRU. To do so, type an at sign (@) followed by the file specification for the indirect command file.

### 2.9.1.2 Wildcards in Input Specifications -

In Section 7.2.2.1, page 7-8, the documentation states that BRU treats all omitted file specification elements as if they were wildcards. This is incorrect. BRU does not treat omitted file names or file types like wildcards. This behavior is consistent with other RSX utilities. BRU differs from other utilities in that:

- If the version number is omitted, it will be treated like a wildcard. For example, NAME.EXT is equivalent to NAME.EXT;\*.
- If only the UFD is specified, the entire file specification will be treated as a wildcard. For example, [UFD] is equivalent to [UFD]\*.\*;\*.

### 2.9.1.3 /NOSUPERSEDE Qualifier Description -

On page 7-19, add the following:

When an output file and an input file have identical file specifications but different version numbers, the /NOSUPERSEDE qualifier causes the input file to be copied but does not delete the output file.

### 2.9.1.4 /VERIFY Qualifier Description -

The description of the BRU /VERIFY qualifier in Section 7.4, page 7-22, is inaccurate. The description should read as follows:

#### **/VERIFY**

Verifies that the output volume was written correctly by comparing the input volume to the output volume and reporting any differences.

During a backup operation, each tape or disk is verified before starting the next volume in the backup set. During a restore operation, however, the entire backup set is restored before beginning the verify operation.

## CORRECTIONS TO DOCUMENTATION

### 2.9.1.5 Changes to Stand-Alone BRU -

In Section 7.5, page 7-23, the device table should be changed as follows:

Device	CSR	Vector	CSR Status
DU	172150	154	not present
MM FOR=0	172440	330	present
MS	172522	224	not present
MT	160000	320	not present
MU	174500	260	present

### 2.9.1.6 Tape Write Error Message -

In Section 7.4, page 7-54, the "User Action" is incorrect for the message "BRU -- \*WARNING\* -- TAPE WRITE ERROR." The correct user action should read as follows:

BRU -- \*WARNING\* -- TAPE WRITE ERROR

**User Action:** Replace the tape that the error occurred on with another. BRU will rewrite this replacement tape from the same point that the previous "bad" tape was begun. This "bad" tape is NOT a part of the backup set and, consequently, should not be used in later verify or restore operations.

If the error recurs on the replacement tape, the problem might be with the tape drive; clean the heads on the tape drive or terminate BRU and start over on another drive.

### 2.9.1.7 MANUAL Option -

In Section 7.6.3, page 7-25, replace the last two paragraphs with the following:

To get a list of the LBNs you have typed so far, type a slash (/) or press the RETURN key.

When you have finished entering bad blocks, type 2 slashes (//). BRU will then allocate the bad blocks which you have entered to BADBLK.SYS and continue processing.

### 2.9.2 DMP

This section corrects errors and omissions in the File Dump Utility (DMP) chapter of the RSX-11M/M-PLUS Utilities Manual. These corrections are as follows:

- New /LIM switch
- /HF switch description

## CORRECTIONS TO DOCUMENTATION

### 2.9.2.1 New /LIM Switch -

Add the following new switch to Table 11-1, page 11-3:

Switch	Description
/LIM:n:m	Specifies the range of bytes n through m of each record or block to be dumped. /OCT is still the default if no format switches are specified.

### 2.9.2.2 /HF Switch Description -

In Section 11.4, page 11-6, replace the last sentence before the example with the following:

Other blocks are output as a data dump in the format selected by /AS, /BY, and so on, in default octal-words.

### 2.9.3 FLX

This section corrects the File Transfer Program (FLX) chapter of the RSX-11M/M-PLUS Utilities Manual. These corrections are as follows:

- Transfer mode switches
- Default file types for the Image mode switch
- /ZE switch description
- /DE/RT switch example
- /NU/RT switch example
- Additional error message

#### 2.9.3.1 Transfer Mode Switches -

On page 4-5, Table 4-1, the following switches accept octal numbers by default:

/FA:n /FB:n /IM:n /BL:n /BS:n /NU:n /ZE:n

If you want to assign decimal numbers to these switches, you must follow the value of n with a period (.). For example, to assign the decimal value 18 to the /IM:n switch you type:

/IM:18.

The /DNS:n switch accepts decimal numbers by default. Therefore, you do not need to follow the value of the /DNS:n switch with a period (.) if the value is decimal.

#### 2.9.3.2 Default File Types for the Image Mode Switch -

On page 4-6, the file type .CDA should be added to the list of default file types for the Image mode switch.

## CORRECTIONS TO DOCUMENTATION

### 2.9.3.3 /ZE Switch Description -

In Table 4-2, FLX Control Switches, on page 4-8, the last sentence of the first paragraph should read:

The /ZE switch does not allow a file specification.

### 2.9.3.4 /DE/RT Switch Example -

In Section 4.4.2, page 4-12, the file specification in the example at the top of the page, as well as the file specification in the following line, should be SYS1.MAC.

### 2.9.3.5 /NU/RT Switch Example -

In Section 4.4.3, page 4-13, the last line in the paragraph following the example should read:

This results in a total of 324(decimal) directory entries, each of which uses 9 words.

### 2.9.3.6 Additional Error Message -

On page 4-21, the following error message should be added:

FLX -- Device size exceeds 65K blocks

**Explanation:** The DU device selected as an RT-11 device is not an RC25, RCF25, RD51, RD52, RD53, or RX50. Devices greater than 65K blocks cannot be supported with FLX.

**User Action:** Reenter the command line specifying a valid RT-11 device.

### 2.9.4 FMT

This section corrects an error in the Disk Volume Formatter (FMT) chapter of the RSX-11M/M-PLUS Utilities Manual.

In Section 5.4, page 5-9, add DL: to the list of devices on which the /WLT and /VE switches can be used.

### 2.9.5 LBR

This section corrects errors and omissions in the Librarian Utility program (LBR) chapter of the RSX-11M/M-PLUS Utilities Manual. These corrections are as follows:

- User file attributes
- Create switch (/CR)
- /IN switch description

## CORRECTIONS TO DOCUMENTATION

### 2.9.5.1 User File Attributes -

On page 10-7, in Figure 10-7, the bytes 40(octal) to the end of the header are referred to as "user file attributes". The documentation does not state what these attributes are or what their relationship is with the FDB of the original file from which the module was created. Insert the following paragraph:

The FDB of the original file from which the module was created has five sections of information, the first being "user file attributes." These attributes are as follows:

- Record type
- Record attribute
- Record size
- Highest virtual block
- End-of-file block number
- Optional information

When you create a file and insert it into a universal library, LBR copies the input file attributes to the module header. You can modify some of these attributes by using the modify header switch (/MH).

### 2.9.5.2 Create Switch (/CR) -

In Section 10.5.2, page 10-12, the format for specifying the Create switch (/CR) is incorrect. The correct format is as follows:

outfile/CR:size:ept:mnt:libtype:infiletype

### 2.9.5.3 /IN Switch Description -

In Section 10.5.8, page 10-19, delete the following sentence:

LBR recognizes only uppercase characters in macro directives.

This is no longer true.

### 2.9.6 PAT

This section corrects an omission in the Object Module Patch Utility (PAT) chapter of the RSX-11M/M-PLUS Utilities Manual.

On page 14-13, add the following new error message:

**UNABLE TO OPEN FILE filename**

**Explanation:** There is insufficient work space in the internal File Storage Region (FSR) of the PAT utility.

**User Action:** Install or Run the PAT utility with an increment.

## CORRECTIONS TO DOCUMENTATION

### 2.9.7 PIP

This section corrects errors and omissions in the the Peripheral Interchange Program (PIP) chapter of the RSX-11M/M-PLUS Utilities Manual. These corrections are as follows:

- /DD switch format
- /TD switch format

#### 2.9.7.1 /DD Switch Format -

In Section 3.2.2.4, page 3-17, the /DD switch examples are incorrect. The correct examples are as follows:

Examples

1. PIP>/DD:01-JUN-80:01-JUL-80&/LI
2. PIP>/DD:\*:1-JUN-80&/LI
3. PIP>/DD:1-JUN-80:\*&/LI

#### 2.9.7.2 /TD Switch Format -

In Section 3.2.2.25, page 3-40, the /TD switch format is incorrect. The correct format is as follows:

PIP>/TD&/LI

### 2.9.8 SLP

This section corrects errors and omissions in the the Source Language Input Program (SLP) chapter of the RSX-11M/M-PLUS Utilities Manual. These corrections are as follows:

- Inaccurate example
- Maximum number of characters in file names
- SLP error message

#### 2.9.8.1 Inaccurate Example -

In Section 13.5.2, page 13-20, the example illustrating the format for SLP error messages is incorrect. The correct example is as follows:

SLP -- FATAL-ILLEGAL SWITCH OR FILESPEC  
SHIRLEY.MAC;2/CF



## CORRECTIONS TO DOCUMENTATION

### 2.9.8.2 Maximum Number of Characters in File Names -

On page 13-21, the "Illegal File Name" error message indicates that file names can be a maximum of 30(octal) characters in length. This is incorrect. SLP file names can be a maximum of 19(decimal) characters in length.

### 2.9.8.3 SLP Error Message -

The error message: SLP -- FATAL-ILLEGAL SWITCH on page 13-22 should read as follows:

SLP -- FATAL-ILLEGAL SWITCH OR FILESPEC  
command line segment

**Explanation:** This error has occurred for one of the following reasons:

- The switch was not a legal SLP switch
- A legal switch was used in an illegal manner
- A file specification could not be parsed

**User Action:** Reenter the command line, specifying the legal switch or correct file specification.

## 2.10 IAS/RSX-11 SYSTEM LIBRARY ROUTINES REFERENCE MANUAL

This section corrects errors and omissions in the IAS/RSX-11 System Library Routines Reference Manual. These corrections are as follows:

- Virtual address units
- Additional SYSLIB routines
- Miscellaneous errors

### 2.10.1 Virtual Address Units

In Section 8.5.2, add the following information to the first paragraph:

Virtual address units are words, and dynamic memory addresses are bytes.

## CORRECTIONS TO DOCUMENTATION

### 2.10.2 Additional SYSLIB Routines

The following program section names and SYSLIB routines should be added to Table 1-1:

#### SYSLIB Routines

Program Section Name	Module Name	Routine Name(s)
PUR\$D	CAT5B (data)	\$CAT5B
	EDTMG (data)	\$EDTMG
PUR\$I	CAT5B (instruction)	\$CAT5B
	EDTMG (instruction)	\$EDTMG

### 2.10.3 Miscellaneous Errors

Correct the following miscellaneous errors in the IAS/RSX-11 System Library Routines Reference Manual:

- In Section 2.1, page 2-3, the box at the top of the page should enclose the "Return Address to \$SAVAL" line.
- In Section 6.2.2, page 6-4, add the following information under NOTE:

For HH, the \$TIM routine always returns two characters for all values specified.

- In Section 8.2, page 8-6, add the following global symbol definition to the second bulleted list:

\$WRKPT      The address of the FDB must be stored in the word \$WRKPT before calling \$INIVM.

- In Section 8.4.1, page 8-16, the words "virtual address" should replace "disk address," in the fourth bulleted list item.

### 2.11 RSX-11M/M-PLUS AND MICRO/RSX TASK BUILDER MANUAL

This section corrects omissions and errors in the RSX-11M/M-PLUS and Micro/RSX Task Builder Manual. These errors and omissions are as follows:

- Miscellaneous errors
- Errors in overlay capability
- Supervisor-mode libraries
- Additions to building SUPER

## CORRECTIONS TO DOCUMENTATION

- Using the /-PI and /LI switches together
- /SHAREABLE:LIBRARY qualifier description
- Changes to the task label block
- Changes to the resident common/library name block date
- Additional error message

### 2.11.1 Miscellaneous Errors

Correct the following miscellaneous errors:

- The occurrence of double brackets is a typographical error. They occur in Chapters 1, 5, 6, and 8.
- The reference on page 1-9 to the "/" character in Chapter 4 is incorrect. Refer to the discussion of the /MP switch in Chapter 10 instead.
- In Section 5.2.3.5, a semicolon (;) is placed after LB in the second line of the example. Replace the semicolon with a colon (:) (LB:).
- On pages 8-8 and 8-17, SYSLIB.OLB is in directory [1,1] and not in [1,2] as indicated.

### 2.11.2 Errors in Overlay Capability

In Section 3.6.1, there is a factual error in steps 10 through 14. These steps should read as follows:

10. Step 3A: Write .ROOT CNTRL-(A0-(A1,A2-(A21,A22)),B0-(B1
11. Step 3B: Write .ROOT CNTRL-(A0-(A1,A2-(A21,A22)),B0-(B1,B2
12. Step 3C: Write .ROOT CNTRL-(A0-(A1,A2-(A21,A22)),B0-(B1,B2)
13. Step 3B: Write .ROOT CNTRL-(A0-(A1,A2-(A21,A22)),B0-(B1,B2),C
14. Step 3C: Write .ROOT CNTRL-(A0-(A1,A2-(A21,A22)),B0-(B1,B2),C)

In Section 3.6.2, a factual error occurs in the .ROOT statement. The statement should read as follows:

```
.ROOT CNTRL-(A0-(A1,A2-(A21,A22)),B0-(B1,B2),C)
```

The root statement with AFCTR included (the last .ROOT statement in Section 3.6.2) should read as follows:

```
.ROOT CNTRL-(AFCTR,B0-(B1,B2),C)
```

In Section 3.6.3, the first .ROOT statement (without the co-tree) should read as follows:

```
.ROOT CNTRL-(AFCTR,B0-(B1,B2),C)
```

The second .ROOT statement should read as follows:

```
.ROOT CNTRL-(AFCTR,B0-(B1,B2),C),CNTRL2-(CNTRLX,CNTRLY)
```

## CORRECTIONS TO DOCUMENTATION

### 2.11.3 Supervisor-Mode Libraries

The map for SUPER on page 8-11 has changed as follows:

SUPER.TSK;3    Memory allocation map    TKB M41.00    Page 1

Partition name : GEN  
Identification : 03.01  
Task UIC : [7,61]  
Task attributes: -HD,PI  
Total address windows: 1.  
Task image size : 128. words  
Task address limits: 000000 000343  
R-W disk blk limits: 000002 000002 000001 00001.

Root segment: CMPAL

R/W mem limits: 000000 000341 000342 00226.  
Disk blk limits: 000002 000002 000001 00001.

Memory allocation synopsis:

Section		Title	Ident	File
-----		-----	-----	-----
. BLK.: (RW,I,LCL,REL,CON)	000000 000342 00226.			
	000000 000140 00096.	CMPAL	03.01	SYSLIB.OLB;1
	000140 000140 00096.	SUPER	01	SUPER.OBJ;3
	000300 000042 00034.	SAVAL	00	SYSLIB.OLB;1

Global symbols:

SEARCH 000220-R    SORT    000140-R    \$CMPAL 000022-R    \$CMPCS 000110-R  
\$SAVAL 000300-R    \$SRTI    000002-R

Task builder statistics:

Total work file references: 300.  
Work file reads: 0.  
Work file writes: 0.  
Size of core pool: 6466. words (25. pages)  
Size of work file: 1024. words (4. pages)

Elapsed time:00:00:08

### 2.11.4 Additions to Building SUPER

On page 8-18, add the following item to the bulleted list describing the memory allocation map in Example 8-2:

- The SEARCH and SORT subroutines that were located at virtual address 352 and 274, respectively, in the virtual address space of SUPER have been relocated to the mode-switching vectors residing at 5112 and 5122 respectively, in TSUP.

### 2.11.5 Using the /-PI and /LI Switches Together

On page 10-30, the documentation incorrectly describes the effect of using the /-PI/LI switches together. If you use these switches when building a library, the region program section name for the library is the same as that of the library root. The name of the library is not .ABS . as documented.

## CORRECTIONS TO DOCUMENTATION

### 2.11.6 /SHAREABLE:LIBRARY Qualifier Description

Section 5.1.1 incorrectly documents the effect of using the /SHAREABLE:LIBRARY qualifier. If you use this qualifier when building a library, the region program section name for the library is the same as that of the library root. The name of the library is not .ABS as documented.

### 2.11.7 Changes to the Task Label Block

Add the following changes to Task Label Block 0 in Figure B-5 and Table B-1 of Appendix B:

```
772  L$BLRL:: ; Label block revision
      ; number

774  L$BFL2:: ; Second task flags word
      T2$FMP 000002 ; Task uses fast map
      ; directive (1=yes)
      T2$CLI 000001 ; Task is a CLI (1=yes)
```

The following is a new bit definition for L\$BFLG:

```
30   L$BFLG:: ; Task flags word
      TS$NEW 000001 ; Label block uses
      ; new format means
      ; L$BLRL describes format)

776  L$AME:: ; Always null for AME
      ; Compatability (the last
      ; word in Label Block 0)
```

### 2.11.8 Changes to the Resident Common/Library Name Block Date

Add the following changes to the Resident Common/Library Name Block Date in Table B-2 of Appendix B:

The following is a new bit definition for R\$LFLG (library flags word):

```
LD$RES 000040 ; Library has memory-resident
              ; overlays
```

### 2.11.9 Additional Error Message

Add the following error message to the RSX-11M/M-PLUS and Micro/RSX Task Builder Manual:

Cluster library element, element-name, is not resident overlaid.

The listed cluster element has been built without memory-resident overlays. This kind of element can not be used as a cluster library element.

Cluster libraries 2 through 6 must be memory-resident and overlaid.

## CORRECTIONS TO DOCUMENTATION

### 2.12 RSX-11M-PLUS GUIDE TO WRITING AN I/O DRIVER

This section corrects errors and omissions in the RSX-11M-PLUS Guide to Writing an I/O Driver. These errors and omissions are as follows:

- Data structures and control blocks
- GTPKT\$ macro call arguments
- Unit status byte
- Description of US.PUB
- Description of U.BUF
- Status control block
- Additional information for the K.OWN function
- Inputs for \$ASUMR
- Incorrect reference
- Unclear SCBDF\$ definition

#### 2.12.1 Data Structures and Control Blocks

The data structures and control blocks in the RSX-11M-PLUS Guide to Writing an I/O Driver are outdated. The corrected data structures and control blocks can be found in the RSX-11M/M-PLUS and Micro/RSX Crash Dump Analyzer Manual.

#### 2.12.2 GTPKT\$ Macro Call Arguments

On page 4-7, Table 4-3, add the following information to the description of the suc argument:

For multiple SCB controllers that support unit operation in parallel but do not require synchronization, K.OWN must be set dynamically by the driver code. For this case, you must specify the suc argument in the GTPKT\$ macro.

#### 2.12.3 Unit Status Byte

On page 4-31, Figure 4-7, the description of US.FOR should read:

US.FOR - Mounted as foreign volume (1=yes)

#### 2.12.4 Description of US.PUB

On page 4-33, the description of US.PUB should read as follows:

US.PUB=4

If set, the device is not a public device.

## CORRECTIONS TO DOCUMENTATION

### 2.12.5 Description of U.BUF

On page 4-36, the address description of U.BUF (in the fifth paragraph) should read as follows:

For a UNIBUS NPR device, bits 4 and 5 in word 1 are memory extension bits; for a MASSBUS or 22-bit Q BUS NPR device (the KS.MBC bit is set), bits 8 through 13 are the memory extension bits.

### 2.12.6 Status Control Block

On page 4-38, Figure 4-9, the S.RCNT field in the Status Control Block should read as follows:

Number of Words to Copy

### 2.12.7 Additional Information for the K.OWN Function

On page 4-52, add the following to the description of the K.OWN function:

4. For multiple SCB controllers that support unit operation in parallel but do not require synchronization, K.OWN must be set dynamically by the driver code. For this case, you must specify the suc argument in the GTPKT\$ macro.

### 2.12.8 Inputs for \$ASUMR

On page 7-9, add the following information to the inputs for the \$ASUMR routine:

M.BFVL(R0)=LOW ADDRESS OF TRANSFER (FOR ODD/EVEN BYTE DETERMINATION)

### 2.12.9 Incorrect Reference

On page 8-1, change the reference in the first paragraph from [200,1] to [USER].

### 2.12.10 Unclear SCBDF\$ Definition

On page 8-13, remove the SYSDEF reference on line 20 and add the following comment:

;Users of this or any control block macro should never specify the  
;SYSDEF argument but should allow the definition to be resolved  
;from the Executive .STB file.

## CORRECTIONS TO DOCUMENTATION

### 2.13 RSX-11M/M-PLUS ERROR LOGGING MANUAL

This section contains a change in Appendix C of the RSX-11M/M-PLUS Error Logging Manual. Appendix C includes an example of the format of an error log packet in memory, as described in the system macro \$EPKDF.MAC. Replace the information under "Type and Subtype codes for fields E\$HTYC and E\$HTYS" with the following information:

```

;
; Type and Subtype codes for fields E$HTYC and E$HTYS
;
; Symbols with names E$Cxxx are type codes for field E$HTYC.
; Symbols with names E$Sxxx are subtype codes for field E$HTYS.
;
E$CCMD      ='B'      1 ; Error Log Control
E$SSTA      ='B'      1 ; Error Log Status Change
E$SSWI      ='B'      2 ; Switch Logging Files
E$SAPP      ='B'      3 ; Append File
E$SBAC      ='B'      4 ; Declare Backup File
E$SSHO      ='B'      5 ; Show
E$SCHL      ='B'      6 ; Change Limits

E$CERR      ='B'      2 ; Device Errors
E$SDVH      ='B'      1 ; Device Hard Error
E$SDVS      ='B'      2 ; Device Soft Error
E$STMO      ='B'      3 ; Device Interrupt Timeout (HARD)
E$SUNS      ='B'      4 ; Device Unsolicited Interrupt
E$STMS      ='B'      5 ; Device Interrupt Timeout (SOFT)

E$CDVI      ='B'      3 ; Device Information
E$SDVI      ='B'      1 ; Device Information Message

E$CDCI      ='B'      4 ; Device Control Information
E$SMOU      ='B'      1 ; Device Mount
E$SDMO      ='B'      2 ; Device Dismount
E$SRES      ='B'      3 ; Device Count Reset
E$SRCT      ='B'      4 ; Block Replacement

E$CMEM      ='B'      5 ; Memory Detected Errors
E$SMEM      ='B'      1 ; Memory Error

E$CSYS      ='B'      6 ; System Control Information
E$SPWR      ='B'      1 ; Power Recovery

E$CCTL      ='B'      7 ; Control Information
E$STIM      ='B'      1 ; Time Change
E$SCRS      ='B'      2 ; System Crash
E$SLOA      ='B'      3 ; Device Driver Load
E$SUNL      ='B'      4 ; Device Driver Unload
E$SHRC      ='B'      5 ; Reconfiguration Status Change
E$SMES      ='B'      6 ; Message

E$CCPU      ='B'     10 ; CPU Detected Errors
E$SINT      ='B'      1 ; Unexpected Interrupt

E$CSDE      ='B'     11 ; Software Detected Events
E$SABO      ='B'      1 ; Task Abort

```



## CHAPTER 3

### RMS-11 VERSION 2.0 RELEASE NOTES

This chapter describes new RMS-11 features and restrictions for RSX-11M-PLUS Version 3.0. Also included are corrections and additions to RMS-11 documentation.

RMS-11 Version 2.0 has not changed version numbers for this release of RSX-11M-PLUS. Information in this chapter has not been incorporated into the RMS-11 manuals.

#### 3.1 NEW FEATURES

RMS-11 Version 2.0 includes the following new features:

- New resident library configuration
- New interface to RSX logical names
- Improved remote access to RSTS/E systems

New features have also been added to several RMS-11 utilities.

##### 3.1.1 New Resident Library Configuration

A new high performance/low system-overhead configuration has been developed for the RMS-11 resident library. The library has been partitioned into three separate segments, not all of which have to be physically resident in memory.

This partitioning allows "demand-paging" of the library segments. Only those segments containing code that is in use must be resident. The remainder of the library segments are eligible for replacement by tasks that can use the physical memory. Not more than two segments are ever required simultaneously by a given user task.

The functional breakdown for the new configuration is as follows:

- RMSRES.TSK is the "root" of the segmented library. The .TSK file and its associated .STB file are the only files needed to link user tasks against RMS-11. This segment supports \$DISPLAY, \$ERASE, \$PARSE, \$SEARCH, \$RENAME, \$FREE, the common internal EXTEND function, all operations for sequential files, all block I/O record operations, all magtape functions and some common code for relative and indexed file \$CREATE, \$OPEN and \$CLOSE operations.

## RMS-11 VERSION 2.0 RELEASE NOTES

- RMSLBL.TSK is the library segment that supports operations for Relative files, \$EXTEND, Indexed file \$OPEN, \$CLOSE, \$CONNECT, \$DISCONNECT, \$FIND and \$GET operations.
- RMSLBM.TSK is the library segment that supports all remaining Indexed file operations; \$DELETE, \$PUT, \$UPDATE, data record insertion and index update for \$PUT and \$UPDATE operations, bucket allocation routine and indexed \$CREATE operation.

### NOTE

All library segments do not need to be physically resident; only the root needs to be installed. However, if an operation requires a satellite that has not been installed, RMS-11 will return ER\$ENV. To avoid complications we recommend installing all segments.

Comparisons with old configuration of the RMS-11 segmented resident library:

- The minimum amount of physical memory required to use the RMS-11 resident library is approximately 22Kb instead of 16Kb. However, if relative or indexed file operations are required, then the minimum size has increased to approximately 36Kb instead of 16Kb. The old configuration was optimized for impact on memory. It has since been determined that impact on system pool usage was a significant problem. Consequently the new configuration attempts to compromise both of these needs.
- The old library consisted of the root (RMSRES) and six satellites (RMSLBA...RMSLBF), each of approximately 8Kb. The new library consists of a root (RMSRES of approximately 22Kb), and two satellites: RMSLBL of approximately 8Kb, and RMSLBM of approximately 14Kb. The new library root combines the old RMSRES, RMSLBA, and RMSLBB. The RMSLBL satellite contains the old RMSLBC and RMSLBD. The RMSLBM satellite contains the old RMSLBE and RMSLBF.
- If most of your RMS-11 applications use only sequential file operations there will be no need for the system to load any satellites. Consequently, the overhead caused by swapping between satellites is eliminated. If your applications use relative or indexed files, a similar effect occurs. Once the appropriate satellite has been loaded, all of the support for that operation is in memory.
- The impact on system pool usage is reduced as a result of the following changes:
  - Two satellites are attached instead of six.
  - The satellites are only attached if they are required.
  - Three partitions are installed instead of seven.
- The new library root is still LB:[3,54]RMSRES.TSK. This will allow existing TKB command files to work as before. All tasks built against the old resident library will transparently use the new library. Incompatible roots and satellites will still result in the error ER\$LIB.

### 3.1.2 New Interface To RSX Logical Names

On systems with the new logical name support, on appropriate RMS-11 operations, the user-provided file specification is sent to a system parse routine that translates any logical names that are present. This support is available in the RMS-11 utilities and in any layered applications for the current release of RMS-11. When in remote access mode, the logical name is not parsed until it reaches the remote node.

See the following RSX-11M-PLUS Version 3.0 manuals for information on new RSX logical names:

- RSX-11M/M-PLUS MCR Operations Manual
- RSX-11M-PLUS Command Language Manual
- RSX-11M/M-PLUS and Micro/RSX Executive Reference Manual

### 3.1.3 Remote Access to RSTS/E Systems

RMSDAP supports remote access to indexed files on RSTS/E systems. See Appendix B of the RSX-11M/M-PLUS RMS-11 User's Guide for more information on remote access.

### 3.1.4 New Utilities Features

This section describes the new enhancements to the following RMS-11 utilities:

- RMSCNV
- RMSBCK
- RMSDSP
- RMSRST

#### 3.1.4.1 RMSCNV -

The RMSCNV utility supports a new /ER switch. The purpose of this switch is to allow RMSCNV to continue processing a file after encountering an exception record. The new switch uses the following format:

/ER:filename

If no /ER switch is used, RMSCNV will terminate after encountering the first exception record. It will issue an error message indicating the type of exception record.

If the /ER:filename switch is used, RMSCNV will continue processing the file. If exception records are encountered, the exception records will be placed in the specified file.

## RMS-11 VERSION 2.0 RELEASE NOTES

### 3.1.4.2 RMSBCK, RMSDSP, and RMSRST -

The RMSBCK, RMSDSP, and RMSRST utilities include enhancements to increase performance and decrease task size. These utilities now process file specifications that include the wildcard characters asterisk (\*) and percent sign (%). These wildcard characters can be used in any position within the directory, file name, file type, and file version number fields. The following new switches have been added to these utilities:

#### RMSBCK New Switches

#### Function

/NOQU	Disables query mode
/NV	Creates a new version of the output file
/CD:date:A	Interprets the creation date as after (:A) the specified date, in normal creation/revision date format
/CD:date:B	Interprets the creation date as before (:B) the specified date, in normal creation/revision date format
/RD:date:A	Interprets the revision date as after (:A) the specified date, in normal creation/revision date format
/RD:date:B	Interprets the revision date as before (:B) the specified date in normal creation/revision date format

#### RMSDSP New Switches

/BR	Briefly displays attributes
/SU	Supersedes existing output file

#### RMSRST New Switches

/NOCV	Disables version radix conversion
/NV	Creates new version of output file

### 3.2 SOFTWARE RESTRICTIONS

This section describes software restrictions as well as other known problems that apply to RMS-11 Version 2.0. Suggested measures for preventing or correcting problems are also included.

#### 3.2.1 RMS-11 Access Methods

- RMS-11 allows the creation of an indexed file with a maximum record size that exceeds its bucket size. However, the file is not usable. You should, therefore, avoid creating an unusable file.

## RMS-11 VERSION 2.0 RELEASE NOTES

- Locate mode does not work when accessing a sequential fixed file if the target record ends on the block boundary. This problem impairs performance. To avoid it, do not use a fixed record size that allows records to fit perfectly in a block.
- Default Extension Quantity (DEQ) does not work correctly for sequential files. When RMS-11 extends a file, it uses the Multiblock Count (MBC) size instead of the pack default. Until this problem is fixed you should specify an explicit DEQ value instead of 0. Consult your programming language documentation for implementation details.
- Current RMS-11 tasks will return the error message "Directory Not Found" (ER\$DNF) on certain file operations that are executed from an account set to nonamed directory mode (SET DEF /NONAMED). This will occur if the following conditions are true:
  1. The tasks were not built against the RMS-11 resident library.
  2. A directory is not provided in either the file specification or the default file specification.To work around this, you should provide a directory in the file specification, or set your terminal to named directory mode (SET DEF /NAMED). If that is not possible, you should rebuild those tasks using the new version of RMS-11.
- Assigning one device to another by using logical names may cause undesirable results. If an application performs a \$PARSE operation on a string, which results in a terminal device (for example DM0:), and there is another entry in the user, group, or system logical table for DM0: to be reassigned to DM1:, then on a subsequent \$OPEN operation RMS-11 will try to access DM1:, not DM0:. To avoid this problem, do not use actual device names as logical names on your system.

### NOTE

In the next major release of RMS-11, it may be possible to receive an underscore in the device name. This will correct the above problem. Consequently, it will be necessary for applications to consider this if they use the file specification returned by RMS-11 to form names for work files (since files cannot have names with an underscore in them).

### 3.2.2 RMS-11 Utilities

The following restrictions apply to RMS-11 utilities for Version 2.0.

#### RMSDES

- RMSDEF is still available for RSX-11M-PLUS Version 3.0, however, the following information should be noted before you try using RMSDEF. Version 3.0 has a new DCL command DEF, which defines logical names. Consequently, when you invoke RMSDEF, you need to type MCR DEF, or modify LB:[1,2]STARTUP.CMD to read INSTALL LB:[3,54]RMSDEF/TASK=...DFN (or a filename of your choice).

## RMS-11 VERSION 2.0 RELEASE NOTES

- Using default areas - when the record size is greater than 1024 bytes, RMSDES selects area bucket sizes that are not large enough. In this case, the file is successfully created, but is unusable. To work around this problem, override the bucket size with the correct value before creating the file.
- Using default areas - when there is a larger number of duplicates than can fit in a bucket (see Chapter 6 of the RSX-11M/M-PLUS RMS-11 User's Guide, for calculation), RMSDES sets up larger than necessary area allocations. These can be overridden by RMSDES SET commands, or the number of duplicates can be reduced and RMSDES will allocate more conservatively.
- Selecting a packed decimal key field - RMSDES never prompts for the length of this field. A subsequent Create operation returns an error "Invalid Key Field Specified for File." Therefore, you must explicitly set the segment length, if you select a packed decimal key.
- RMSDES uses the system device as the default device on a GET file DAT command. This default may be inconvenient if your login device is not the system device, or if you have set your default device to other than the system device by issuing the DCL SET DEF or MCR ASN commands. To work around this, you should supply the device name in the file specification.

### RMSIFL

- RMSIFL aborts with a memory management violation when more than one file is processed in the same RMSIFL session and the /DE switch is used. A temporary means of working around this problem is to invoke RMSIFL for each file.
- RMSIFL uses a sort algorithm that, when called upon to sort on a key, does not preserve the FIFO ordering of duplicates. For alternate keys, it is necessary to work around this problem by using RMSCNV. If the only concern is ordering of duplicates in the primary key, then as long as your input file is an indexed file or a file sorted on primary key, you can use RMSIFL /NOSO.

### RMSCNV and RMSIFL

- RMSCNV and RMSIFL ignore user provided area extension quantities when loading a file. The values that they use are large enough to reduce the number of file extensions in most cases.

## 3.3 CORRECTIONS TO PROBLEMS WITH THE PREVIOUS RELEASE

This section describes corrections to software problems relating to the previous release of RMS-11 Version 2.0.

## RMS-11 VERSION 2.0 RELEASE NOTES

### 3.3.1 RMS-11 Access Methods

The following corrections apply to RMS-11 access methods:

- Records loaded into an indexed file by descending key value were not all found when either random access or sequential access was used. This problem has been corrected.
- The first word of a block in a file was sometimes corrupted with a -1 when an \$UPDATE operation was performed on a sequential file. This occurred when a \$FIND or an \$UPDATE operation followed a \$GET operation on the last record in a block, if that record ended at the end-of-file or within one byte of end-of-file. The -1 appeared in the first word of the block. This problem has been corrected.
- In some cases there were problems with Update operations to an indexed variable file containing alternate keys when record sizes were increased during \$UPDATE operations. In cases where the new record no longer fit in the old bucket, the record was written to a new bucket with an incorrect RRV pointer. Later attempts to get that record by using the alternate key would return the ER\$RRV condition. If you have experienced this problem, reload your indexed files with RMSIFL in order to fix the alternate key tree(s).
- A problem with the single-precision multiply routine in the access methods has been corrected. When calculations were performed that would produce a value larger than 131073, an incorrect value resulted. This value transferred the bits in the high word of the two-word value to the low word. For example, in a relative file with 3 block buckets, an attempt to insert relative record 43692 by issuing a \$PUT operation, resulted in writing the record to block 3 rather than block 131076. This problem affected random \$PUT and \$GET operations in relative files and fixed sequential files. For relative files, the multiplication of the relative record number by the bucket size in blocks would be invalid. For sequential fixed files, the multiplication of the relative record number by the record size in bytes would be invalid. This problem has been corrected. You should reload your files if your applications were affected by this problem.

### 3.3.2 RMS-11 Utilities

The following corrections apply to RMS-11 utilities:

#### RMSCNV

- A problem with the /EO switch in RMSCNV has been fixed. This switch enables the conversion of the ASCII CTRL-Z EOF terminator to a null, and pads the rest of the file with nulls. This problem has been corrected.

#### RMSIFL

- Using the /DE switch allows the five RMSIFL sort files to be redirected to alternate devices rather than the device used in the input file specification. This switch failed in several ways. RMSIFL reported either "Failure to Create IFLA.TMP (ER\$CRE)" or "Extraneous Data in File Specification (ER\$XTR)" In some cases, it sent data output to the console device. This problem has been corrected.

## RMS-11 VERSION 2.0 RELEASE NOTES

- Using RMSIFL with an indirect command file (IFL @file.cmd) would return the message "?Output file must be empty" on any commands following the first command. This would abort a batch submission. This problem has been corrected.
- The RMSIFL utility was not functioning properly when it attempted to process a file with the /ER:filename switch. This problem has been corrected.
- RMSIFL was failing to display the correct exception record type in the exception record file if the exception record was detected on the alternate key. This problem has been corrected.
- RMSIFL was returning an incorrect output record count and exception record count after processing a file. Any exception detected in the alternate key caused these counts to be displayed as "????". This problem has been corrected.
- RMSIFL displayed an incorrect primary key value when exception records were detected on the primary key. Exceptions on alternate keys, however, worked fine. The problem only occurred when no /ER switch was specified. This problem has been corrected.
- There is a new form of IFLNON.CMD and IFLNRN.CMD that includes the PAR statement. This form of command file does not need to be modified when RMSIFL is rebuilt to incorporate new modules. This corrects the previous problem of needing to modify command files. See the RSX-11M/M-PLUS and Micro/RSX Task Builder Manual for further information on tailoring the command file to reduce the size of RMSIFL.
- RMSIFL did not correctly handle PACKED DECIMAL alternate keys. It rejected these as exception records during the alternate key loading phase. This problem has been corrected.
- RMSIFL did not return correct exit status when it encountered a corrupted index. This caused batch jobs to run incorrectly. This problem has been corrected.
- RMSIFL that is built to use supervisor mode RMSRES was aborting with a memory protection violation in certain cases. This problem has been corrected.

### RMSRST

- The /SE switch is used to selectively restore files from a container. RMSRST did not always find the files specified because of an incorrect order-based algorithm. This problem has been corrected.
- When an explicit file specification was given with the /SE switch, RMSRST found the file but continued "searching" through the tape. This problem has been corrected.
- The use of a wildcard directory in the output specification would not restore the file(s) to the original owner account. This problem has been corrected.



### 3.4 DOCUMENTATION CORRECTIONS

The RMS-11 Version 2.0 manuals are not being revised for this release. This section describes documentation errors and directs you to the appropriate sections in the manuals to make corrections. New information to be added to the manuals is also included in this section.

#### 3.4.1 RSX-11M/M-PLUS RMS-11 User's Guide

In Section 2.2.3.3, please add the following information to the discussion of deadlock:

An application should use multistream rather than multi-channel access to write to the same indexed file. When RMS-11 updates an RRV in a bucket that is currently locked, it must wait for that lock to be released. Control will not be returned to the program until this release occurs. Deadlock will occur when the lock is held on another channel within the same program; however, RMS-11 can update an RRV in a bucket that is locked on another stream within the same program. See your programming language documentation for details on the implementation of multistreaming.

In Section 6.2.4, the discussion of writing a record, please add the following note:

In the event that the record includes a partial alternate key but is not large enough to include space for the full alternate key field, RMS-11 will act as follows:

RMS-11 will treat the alternate key as if it were not present in the record, making no entry in the alternate key index structure.

In Section 6.3, the discussion of contiguity and areas, please add the following information:

You will obtain a small benefit by setting areas to contiguous on a noncontiguous multi-area file, however, there is no means for RMS-11 to determine if those areas remain contiguous. Consequently, RMSDSP and RMSDES will display them as noncontiguous. As long as the areas are preallocated, they will behave like contiguous areas; as soon as they need to be extended, they will not behave like contiguous areas.

In Section 8.1.2.1, the discussion of task building against the RMS-11 resident library, incorrect syntax is documented for the cluster option in the Task Builder command file. The correct syntax is as follows:

```
CLSTR = RMSRES,DAPRES:RO
```

In Appendix B, the discussion of remote file and record access using DECnet, the documentation states that the RSTS/E FAL does not support remote record access to indexed files. This is no longer true.

## RMS-11 VERSION 2.0 RELEASE NOTES

### 3.4.2 RSX-11M/M-PLUS RMS-11 Macro Programmer's Guide

In Section 2.3, the argument for P\$BUF is "bufcount". This is incorrect. The correct argument is "iopoolsize", as discussed in Section 2.3.4.

In Section 5.19, the last paragraph incorrectly describes the use of the FID field in the NAM block. It should read as follows:

"If this value is non-zero..."

In Appendix A, page A-8, please add the following sentence:

ER\$KEY may also be caused by an attempt to insert a record that is too small to contain the whole primary key field.

Also in Appendix A, please add the following error conditions:

ER\$BEQ	Bad Logical equivalence string (Octal: 177510, Decimal: -184)
ER\$FTB	File specification became too big due to logical name (Octal: 176364, Decimal: -780)
ER\$TRN	Too many logical name translations (Octal: 174550, Decimal: -1688)

### 3.4.3 RSX-11M/M-PLUS RMS-11 Utilities

In the Section 3.3.2 discussion of exception records, modify the exception record codes to read as follows:

002: Record contains a duplicate key where not allowed

This change indicates a duplicate in either the primary or alternate key fields when no-duplicates was specified.

## 3.5 FILES AND PLACEMENT ON THE DISTRIBUTION KIT

The following table describes the contents of the RMS-11 Version 2.0 distribution kit.

### NOTE

Some file names are marked with an asterisk. This indicates that the files are not included on RL02 and RC25 distribution kits. They are excluded because of space reasons on the kit, and because they are only used to rebuild components of RMS-11 Version 2.0.

File Name	Destination	Comments
RMSMAC.MLB	LB:[1,1]	Can be deleted if you are not using MACRO-11 RMS-11 programs.
RMSLIB.OLB	LB:[1,1]	Object library for RMS-11 local access.
RMSDAP.OLB	LB:[1,1]	Object library for RMS-11 remote access.
		Can be deleted if you do not need remote access.
RMSBCK.TSK	LB:[3,54]	RMSBCK utility; uses RMSRES.

(continued on next page)

# RMS-11 VERSION 2.0 RELEASE NOTES

File Name	Destination	Comments
RMSRST.TSK	LB:[3,54]	RMSRST utility; uses RMSRES.
RMSDEF.TSK	LB:[3,54]	RMSDEF utility; uses RMSRES.
RMSDSP.TSK	LB:[3,54]	RMSDSP utility; uses RMSRES.
RMSCNV.TSK	LB:[3,54]	RMSCNV utility; uses RMSRES.
RMSDES.TSK	LB:[3,54]	RMSDES utility; uses RMSRES.
RMSIFL.TSK	LB:[3,54]	RMSIFL utility; uses RMSRES.
RMSDES.IDX	LB:[1,2]	Indexed help file used by RMSDES.
RMS11.ODL	LB:[1,1]	Prototype ODL file.
RORMS1.MAC	LB:[1,1]	For use with the prototype ODL.
RMS11S.ODL	LB:[1,1]	ODL file for sequential.
RMS12S.ODL	LB:[1,1]	ODL file for sequential.
RMS11X.ODL	LB:[1,1]	Standard indexed file ODL.
RMS12X.ODL	LB:[1,1]	Indexed file ODL.
RMSRLX.ODL	LB:[1,1]	ODL for use with RMSRES.
DAP11X.ODL	LB:[1,1]	ODL for use with overlaid RMSDAP.
DAPRLX.ODL	LB:[1,1]	ODL for use with DAPRES.
RMSRES.TSK	LB:[1,1]	TSK image for linking against RMSRES, as a non-supervisor mode library.
RMSLBL.TSK	LB:[1,1]	Task image for RMSRES segment.
RMSLBM.TSK	LB:[1,1]	Task image for RMSRES segment.
RMSRES.STB	LB:[1,1]	STB file for RMSRES.
DAPRES.TSK	LB:[1,1]	Task image for RMSDAP resident library.
DAPRES.STB	LB:[1,1]	STB file for DAPRES.
RMSLBL.MAP*	LB:[1,34]	Maps for segmented library.
RMSLBM.MAP*	LB:[1,34]	
DAPRES.MAP*	LB:[1,34]	
RMSRES.TSK	LB:[3,54]	Task image for linking in supervisor mode. Also installed as the root of the library (supervisor mode and non-supervisor mode).
RMSRES.STB	LB:[3,54]	STB file for linking supervisor mode tasks.
RMSRES.MAP*	LB:[3,54]	Map file for supervisor mode library.
RMSFAK.CMD*	LB:[1,24]	For rebuilding RMSRES.
RMSROT.STB*	LB:[1,24]	
RMSROT.CMD*	LB:[1,24]	
RMSZAP.CMD*	LB:[1,24]	
RMSLBL.CMD*	LB:[1,24]	For rebuilding RMSLBL.
RMSLBL.ODL*	LB:[1,24]	
RMSLBM.CMD*	LB:[1,24]	For rebuilding RMSLBM.
RMSLBM.ODL*	LB:[1,24]	
DAPRES.CMD*	LB:[1,24]	For rebuilding DAPRES.
DAPRES.ODL*	LB:[1,24]	
BCKNON.CMD*	LB:[1,24]	For rebuilding the overlaid version of RMSBCK.
BCKNON.ODL*	LB:[1,24]	
BCKNRN.CMD*	LB:[1,24]	For rebuilding the resident library version of RMSBCK.
BCKNRN.ODL*	LB:[1,24]	
BCKNSN.CMD*	LB:[1,24]	For rebuilding the supervisor mode version of RMSBCK.
BCKNSN.ODL*	LB:[1,24]	
CNVNON.CMD*	LB:[1,24]	For rebuilding the overlaid version of RMSCNV.
CNVNON.ODL*	LB:[1,24]	
CNVNRN.CMD*	LB:[1,24]	For rebuilding the resident library version of RMSCNV.
CNVNRN.ODL*	LB:[1,24]	

(continued on next page)

# RMS-11 VERSION 2.0 RELEASE NOTES

File Name	Destination	Comments
CNVNOO.CMD*	LB:[1,24]	For rebuilding the overlaid
CNVNOO.ODL*	LB:[1,24]	version of RMSCNV with RMSDAP.
CNVNRR.CMD*	LB:[1,24]	For rebuilding the resident
CNVNRR.ODL*	LB:[1,24]	library version of RMSCNV with RMSDAP.
CNVNSN.CMD*	LB:[1,24]	For rebuilding the supervisor
CNVNSN.ODL*	LB:[1,24]	mode version of RMSCNV.
DEFNON.CMD*	LB:[1,24]	For rebuilding the overlaid
DEFNON.ODL*	LB:[1,24]	version of RMSDEF.
DEFNRN.CMD*	LB:[1,24]	For rebuilding the resident
DEFNRN.ODL*	LB:[1,24]	library version of RMSDEF.
DEFNSN.CMD*	LB:[1,24]	For rebuilding the supervisor
DEFNSN.ODL*	LB:[1,24]	mode version of RMSDEF.
DESNON.CMD*	LB:[1,24]	For rebuilding the overlaid
DESNON.ODL*	LB:[1,24]	version of RMSDES.
DESNRN.CMD*	LB:[1,24]	For rebuilding the resident
DESNRN.ODL*	LB:[1,24]	library version of RMSDES.
RMSDES.ODL*	LB:[1,24]	
DESNSN.CMD*	LB:[1,24]	For rebuilding the supervisor
DESNSN.ODL*	LB:[1,24]	mode version of RMSDES.
DSPNON.CMD*	LB:[1,24]	For rebuilding the overlaid
DSPNON.ODL*	LB:[1,24]	version of RMSDSP.
DSPNRN.CMD*	LB:[1,24]	For rebuilding the resident
DSPNRN.ODL*	LB:[1,24]	library version of RMSDSP.
DSPNSN.CMD*	LB:[1,24]	For rebuilding the supervisor
DSPNSN.ODL*	LB:[1,24]	mode version of RMSDSP.
IFLNON.CMD*	LB:[1,24]	For rebuilding the overlaid
IFLNON.ODL*	LB:[1,24]	version of RMSIFL.
IFLNRN.CMD*	LB:[1,24]	For rebuilding the resident
IFLNRN.ODL*	LB:[1,24]	library version of RMSIFL.
IFLNSN.CMD*	LB:[1,24]	For rebuilding the supervisor
IFLNSN.ODL*	LB:[1,24]	mode version of RMSIFL.
RSTNON.CMD*	LB:[1,24]	For rebuilding the overlaid
RSTNON.ODL*	LB:[1,24]	version of RMSRST.
RSTNRN.CMD*	LB:[1,24]	For rebuilding the resident
RSTNRN.ODL*	LB:[1,24]	library version of RMSRST.
RSTNSN.CMD*	LB:[1,24]	For rebuilding the supervisor
RSTNSN.ODL*	LB:[1,24]	mode version of RMSRST.
RMSUTL.OLB*	LB:[1,24]	For rebuilding several utilities
RMSODL.ODL*	LB:[1,24]	
GSA.MAC	LB:[200,1]	Demonstration program included as an illustration of how to extend an RMS-11 task in the event of pool exhaustion.
PARSE.MAC	LB:[200,1]	Demonstration programs for the
SEARCH.MAC	LB:[200,1]	new directory and wildcarding
RENAME.MAC	LB:[200,1]	facilities.
ERASE.MAC	LB:[200,1]	
PARSE.TSK	LB:[200,1]	
SEARCH.TSK	LB:[200,1]	
RENAME.TSK	LB:[200,1]	
ERASE.TSK	LB:[200,1]	

## NOTE

All RMSDAP files can be deleted if you are not using RMS-11 to access files on remote nodes.

### 3.6 RMS-11 VERSION 2.0 INSTALLATION

On RSX-11M-PLUS systems, all RMS-11 files are automatically on your system after system generation.

#### 3.6.1 Startup Command Procedures

To install RMS-11, install the resident libraries and RMS-11 utilities at system startup. To aid you in the installation process, the file LB:[1,2]STARTUP.CMD contains commands and sample comments that can be edited to become system startup commands. Please note the following items:

- On RL02 and RC25 pregenerated systems, the RMS-11 segmented library (RMSRES, RMSLBL, RMSLBM) and all the RMS-11 utilities are already installed in the system image. For these kits, the only installation that is needed is the optional installation of the DAPRES resident library if the system has DECnet support and if RMS-11 remote access facilities are to be used.
- On systems other than RL02 and RC25, the startup file contains commands that install the segmented resident library in the system image. Note that these are commands, not comments; if you do not want to install the library, you should edit the file to make these commands comments. Please note the following items:
  - All resident libraries should be installed using the option /RON=YES.
  - The root of the library, RMSRES, must be the task image contained in [3,54]. The [1,1]RMSRES.TSK should never be installed in the system; it is only used when tasks are linked to use the non-supervisor mode version of RMSRES.
  - Failure to install the root segment RMSRES will cause the error "INS -- Common block not Loaded RMSRES" when a referencing task or utility is invoked. Failure to install any of the remaining resident library segments will not give an error at invocation. However, it may cause the error codes ER\$LIB or ER\$ENV, or a BPT trap (with R0 containing ER\$LIB), when the missing segment is needed by RMS-11.
  - There are several circumstances involving "inconsistent or incomplete resident libraries" that can cause a BPT trap to be generated with R0 containing the error code ER\$LIB. This can occur if not all the segments of the library are installed or if the version numbers of one or more segments do not match the root segment, the RMSDAP code, or the task itself. In particular, this can happen to the RMS-11 utilities if they are built to use the segmented resident library and the segments are installed incorrectly.

## RMS-11 VERSION 2.0 RELEASE NOTES

- The resident libraries have been built with the PAR=parname option in the TKB command file, where parname is the name of the resident library. This feature was included for compatibility with RSX-11M systems. You should install the resident libraries in the GEN partition. Do not generate individual partitions for the libraries on RSX-11M-PLUS; doing so would negate much of the benefit of having a "demand-paged" segmented library.
- If you are using RMSRES in supervisor mode, you do not need to install a different task. You simply need to link your task.
- If you want to use the RMS-11 utilities or the RMSDAP resident library (RMSDAP), you must edit the startup command file, which contains template commands (comments) that you can edit to install these facilities.

### 3.6.2 Utility Configurations

The RMS-11 utilities that are provided on the distribution kit are built to use the segmented resident library. Consequently, RMSRES, RMSLBL and RMSLBM should be installed before you use any of the RMS-11 utilities.

#### 3.6.2.1 Utility Command and ODL Files -

For each utility, a command and ODL file is provided that can be used to build the utility using disk-overlaid RMS-11. The names of the files are the following:

For RMSBCK: BCKNON.CMD,BCKNON.ODL,RMSODL.ODL  
For RMSRST: RSTNON.CMD,RSTNON.ODL,RMSODL.ODL  
For RMSCNV: CNVNON.CMD,CNVNON.ODL  
For RMSDSP: DSPNON.CMD,DSPNON.ODL,RMSODL.ODL  
For RMSDES: DESNON.CMD,DESNON.ODL,RMSDES.ODL  
For RMSDEF: DEFNON.CMD,DEFNON.ODL,RMSODL.ODL  
For RMSIFL: IFLNON.CMD,IFLNON.ODL

#### NOTE

These command and ODL files are not supplied with the RL02 and RC25 kits.

For each utility, a command and ODL file is provided that can be used to build the utility using the supervisor mode library, RMSRES. The names of the files are as follows:

For RMSBCK: BCKNSN.CMD,BCKNSN.ODL  
For RMSRST: RSTNSN.CMD,RSTNSN.ODL  
For RMSCNV: CNVNSN.CMD,CNVNSN.ODL  
For RMSDSP: DSPNSN.CMD,DSPNSN.ODL  
For RMSDES: DESNSN.CMD,DESNNSN.ODL  
For RMSDEF: DEFNSN.CMD,DEFNSN.ODL  
For RMSIFL: IFLNSN.CMD,IFLNSN.ODL

### 3.6.2.2 Rebuilding the Utilities -

To rebuild the utilities, follow these steps:

1. Log in to a privileged account.
2. Set your default account to [1,24] on the system disk.
3. Use TKB to build the utility or utilities.

The utilities and the corresponding map files will be built in the current account. You may then want to put the utility in the system account ([3,54]).

Each command file for a particular utility creates a utility of the correct name. For example, CNVNRN.CMD and CNVNON.CMD both produce task images called RMSCNV.TSK. One is built to use the resident library and one is built with disk-overlaid RMS-11.

### 3.7 REPORTING PROBLEMS

Software Performance Reports (SPRs) allow you to report any software problems directly to DIGITAL. Appendix B of this manual includes the general procedures for filling out Software Performance Reports.

The following additional information should be submitted with SPRs for RMS-11 software:

1. Include the version number and patch level of the RMS-11 that you are using.
2. Indicate whether you are using a programming language to process the file(s) and, if so, include the version number and patch level of the language.
3. Include a Postmortem Dump and a map of the task involved, if RMS-11 aborts (or if some other task crashes and RMS-11 appears to be the cause).
4. Include copy(s) of the file(s) involved, in RMSBCK format.
5. Include copies of the files that can cause the error, if the errors are reproducible. If the problem is not reproducible, include a copy of the corrupt file if possible.
6. Include a description of the command line(s) or interactive session that led to the error (for RMS-11 utilities).
7. Include a listing of the actual error, if possible.





## APPENDIX A

### THE DIGITAL EQUIPMENT COMPUTER USER'S SOCIETY (DECUS)

DECUS, the DIGITAL Equipment Computer User's Society, is one of the largest and most active user groups in the computer industry. It is a not-for-profit association, supported and administered by DIGITAL, but actively controlled by members. DECUS headquarters, located in Marlborough, Massachusetts, administers all international policies and activities. Members include individuals who have purchased, leased, ordered, or used a DIGITAL computer, or anyone who has a genuine interest in DECUS. Membership is free and voluntary.

#### A.1 DECUS GOALS

The primary goals of DECUS are as follow:

- To advance the art of computation through mutual education and exchange of ideas and information
- To establish standards and provide channels to facilitate the exchange of computer programs
- To provide feedback to DIGITAL regarding hardware and software customer needs
- To advance the effective use of DIGITAL computers, peripherals, and software by promoting the interchange of information

To further these goals, DECUS serves its members by holding symposia; maintaining a program library; publishing an association newsletter, technical newsletters, and books; and supporting a number of Special Interest Groups (SIGs).

#### A.2 DECUS ACTIVITIES

Local, regional, and national DECUS organizations give members the opportunity to meet other DIGITAL customers and employees in an informal setting. From the monthly local meetings to the national symposia, members can discuss their ideas, learn what others are doing, and give DIGITAL valuable feedback for future product development.

## THE DIGITAL EQUIPMENT COMPUTER USER'S SOCIETY (DECUS)

Often, the national meetings in the various countries also provide the stage for major new product announcements as well as a showplace for interesting developments in both hardware and software technology. At any meeting, members might describe ideas and programs they have implemented, or fine-tuning that has been achieved for a particular application. Members present papers, participate in panel discussions, lead workshops, and conduct demonstrations for the benefit of other members.

Many of the technical papers and presentations from each symposium are published as a book, the DECUS Proceedings. Copies of the DECUS Proceedings are supplied to symposia attendees and can be purchased by DECUS members. DECUS also publishes newsletters focusing on special interests and a society newsletter.

DECUS has a Program Library, which contains over 1,700 software packages that are written and submitted by users. A wide range of software is offered, including languages, editors, numerical functions, utilities, display routines, games, and other types of application software. Library catalogs are available that contain program descriptions and ordering information. The programs are available for a nominal service charge that covers the cost of reproduction and media.

Many DECUS members derive additional benefits from joining a DECUS Special Interest Group (SIG). SIGs often meet as subsets of regional and national meetings. They may also meet on their own, to discuss their special field, such as operating systems, languages, processors, and applications. There are at least 25 SIGs in the United States alone. Many of the SIGs print newsletters and disseminate valuable technical information to members.

To obtain a membership form for DECUS, contact a DIGITAL sales representative or the nearest DECUS chapter office.

## APPENDIX B

### REPORTING PROBLEMS

This appendix describes the procedure for submitting a Software Performance Report (SPR). An SPR allows you to report any problems with or questions about your system directly to DIGITAL.

An SPR can be used for:

- Software errors
- Documentation errors (when the documentation comment form is not appropriate)
- Follow-up on a previous SPR
- Questions
- Suggestions

An SPR cannot be used for:

- Software license and price policies
- Obvious hardware problems
- Logistical or clerical problems with kits, such as blank media, or failure to receive the Software Dispatch
- Problems with user-written software

In general, when you complete an SPR use the following guidelines:

- Describe only one problem per form. This will facilitate a more rapid response because it allows the person answering it to concentrate more fully on that particular problem. One problem per form also helps simplify record keeping.
- Define as accurately as possible the state of the system and circumstances when the problem occurred.
- Illustrate the problem with specific examples.
- If you report a documentation error, specify the title of the manual, and include the section and page number where the error occurred. Include a table or figure number if appropriate.

## REPORTING PROBLEMS

SPRs are assigned a priority of 1 through 5. An SPR that is assigned a priority of 1 receives the highest priority. Priorities are described as follows:

1. Most production work cannot be run.
  - Major system functions are unusable.
  - You cannot boot the system.
  - Necessary peripherals cannot be used.
2. Some production work cannot be run.
  - Certain functions are unusable.
  - System performance has declined.
  - Installation does not have excess capacity.
3. All production work can be run with some user impact.
  - Significant manual intervention is required.
  - System performance has declined.
  - Installation has excess capacity.
4. All production work can be run with no significant impact on user.
  - Problem can be patched or easily bypassed.
5. No system modifications are needed to return to normal production.
  - Suggestions, consultations, or errors in documentation.

You can submit the following categories of SPRs:

1. Problem/Error SPR

This type of SPR contains a software problem. It is assigned a priority of 1 through 5. You receive an answer to this report.

2. Suggested Enhancement

This type of SPR contains a suggestion. It is assigned a priority of 5. You do not receive an answer to this report.

3. Other

This type of SPR contains a question or suggestion. It is assigned a priority of 5. You may or may not receive an answer to this type of report.

Please supply the following information (in machine-readable form where applicable) when you report a problem:

1. CRASH - A copy of the Executive task-build map, output from the console terminal, the SYSGEN saved-answer file, the Executive STB file, and the crash dump. If the crash is reproducible, please accurately describe the details and supply a hard copy or user source code when necessary.

## REPORTING PROBLEMS

2. DRIVERS - Controller/device information, software options, error log output, copy of device registers, and a sample program.
3. UTILITIES - A copy of your terminal output, showing setup commands, before and after effects, and relevant file information.
4. TASK BUILDER - A copy of your terminal output command files, the task map, and a dump of the first few blocks of the task image.
5. FILE SYSTEM - Corrupted volume: Output from verification utility and dump of the volume. Improper results: Error code, file header dump, sample program.
6. ERROR LOG REPORT GENERATOR (RPT) - A copy of the report file generated by RPT, either on a hard copy listing or on machine-readable media.

If a failure occurs when you are running privileged, add-on software (for example, DECnet), try to reproduce the failure without the additional software. Then, when you write the SPR, indicate how the system operated with and without the add-on software.

The SPR process is sometimes lengthy. Therefore, if you have a critical problem, contact your local DIGITAL office. In the meantime, read the Software Dispatch for news on RSX-11M-PLUS, which includes changes and problems other people have found and solved.



## APPENDIX C

### APPLYING CORRECTIONS TO SOURCE FILES

Interim changes to the Executive, MCR, and device drivers are made by creating correction files that are processed by the Source Language Input Program (SLP). SLP generates a new copy of the modules that contain the errors by applying the corrections to the source file on the distribution kit. (See the RSX-11M/M-PLUS Utilities Manual for complete information on SLP.)

After you have applied the corrections and obtained a new version of the file, DO NOT delete the original source file. Interim changes that may be distributed later are cumulative and depend on having the original sources available.

#### C.1 UPDATING AN EXECUTIVE SOURCE MODULE

To update an Executive source file (ABCDEF.MAC, for example), mount the disk on which you performed your SYSGEN and create a SLP correction file named ABCDEF.COR in the UFD [11,40]. (All instructions below assume that you are working on the disk on which you performed your SYSGEN.) Then, running under UIC [11,10], submit the correction file to SLP. For example, you could follow this sequence to update REQSB.MAC:

```
>SET /UIC=[11,40]
>EDI REQSB.COR
[CREATING NEW FILE]
INPUT
REQSB.MAC;2/AU/-BF=REQSB.MAC;1
.
.
.
*EX
[EXIT]

>SET /UIC=[11,10]
>SLP @[11,40]REQSB.COR
```

If the updated Executive module in your system is not a loadable driver, you must:

1. Assemble the new module, using the RSXMC.MAC file for the target system. For example:

```
>SET /UIC=[11,24]
>MAC REQSB,[11,34]REQSB/-SP=[1,1]EXEMC/ML,[11,10]RSXMC/PA:1,REQSB
```

## APPLYING CORRECTIONS TO SOURCE FILES

2. Use LBR to replace the old version of the module in RSX11M.OLB on the target system. For example:

```
>SET /UIC=[1,24]
>LBR RSX11M/RP=[11,24]REQSB
```

3. Perform the following sections of SYSGEN:

```
Building the Executive and Drivers
Building the Privileged Tasks
Creating the System Image File
```

If the modified file in your system is a loadable device driver (ZZDRV.MAC, for example), the updated module can be replaced without rebuilding the Executive. Assemble the updated module and replace the resulting object file in the RSX11M.OLB of your target system. For example, assuming that [11,10] contains the RSXMC.MAC file resulting from your system generation, do the following:

```
>SET /UIC=[11,24]
>MAC ZZDRV=[1,1]EXEMC/ML,[11,10]RSXMC/PA:1,ZZDRV
>SET /UIC=[1,24]
>LBR RSX11M/RP=[11,24]ZZDRV
```

Use [200,200]ZZDRVBLD.CMD to rebuild the driver. If necessary, copy ZZDRV.TSK and ZZDRV.STB into the UFD corresponding to the system UIC.

```
>ASN SY:=OU:
>TKB @[200,200]ZZDRVBLD
>SET /SYSUIC
SYSUIC=[g,m]
>SET /UIC=[g,m]
>PIP /NV=[1,54]ZZDRV.TSK,ZZDRV.STB
```

Use VMR to unload the old device driver and to load the new one. If the new driver is larger than the old one, it may not fit into the same locations as the old one. It may be necessary to unload and reload all of the loadable drivers in that partition to create enough room.

```
>VMR
ENTER FILENAME: RSX11M
VMR>UNL ZZ:
VMR>LOA ZZ:
VMR>^Z
>RUN $SHUTUP
```

Hardware boot the modified system.

### C.2 UPDATING AN MCR SOURCE MODULE

To update the MCR source file SETOV.MAC, use the following procedure:

Create the SLP correction file [12,40]SETOV.COR and use it to update [12,10]SETOV.MAC. Assemble SETOV for the target system.



## APPLYING CORRECTIONS TO SOURCE FILES

```
>SET /UIC=[12,40]
>EDI SETOV.COR
[CREATING NEW FILE]
INPUT
SETOV.MAC;2/AU/-BF=SETOV.MAC;1
.
.
*EX
[EXIT]

>SET /UIC=[12,10]
>SLP @[12,40]SETOV.COR
```

Assuming [11,10] contains the RSXMC.MAC file resulting from your target system generation, do the following:

```
>SET /UIC=[12,24]
>MAC SETOV=[1,1]EXEMC/ML,[11,10]RSXMC/PA:1,[12,10]SETOV
```

All of the Task Builder command files output a map to the logical device MP:. MP: must be assigned to NL: or another device to avoid a diagnostic error message from the Task Builder.

If it was necessary to modify the MCR Task Builder command file (MCRBLD.CMD) during the last system generation, it may now be necessary to repeat those changes. To rebuild the secondary portion of MCR (...MCR) and replace the module SETOV, use the following procedure:

```
>SET /UIC=[1,24]
>LBR MCR/RP/NOEP=[12,24]SETOV
>PIP SETOV.OBJ;*/DE
>ASN SY:=MP:
>ASN SY:=IN:
>TKB @MCRBLD
>VMR
ENTER FILENAME: RSX11M
VMR>REM ...MCR
VMR>INS MCR
VMR>^Z
```

To rebuild the MCR dispatcher (MCR...) and replace the module MCRDIS, use the following procedure:

```
>SET /UIC=[1,24]
>LBR MCR/RP/NOEP=[12,24]MCRDIS
>PIP MCRDIS.OBJ;*/DE
>ASN SY:=MP:
>ASN SY:=IN:
>TKB @MCDBLD
>SET /SYSUIC
SYSUIC=[g,m]
>SET /UIC=[g,m]
>PIP /NV=[1,54]MCD.TSK
>VMR
ENTER FILENAME: RSX11M
VMR>REM MCR...
VMR>INS MCD/XHR=NO
VMR>^Z
>RUN $SHUTUP
```

## APPLYING CORRECTIONS TO SOURCE FILES

There is only one procedure for replacing an external MCR task. It involves the following steps:

1. Create the SLP file, apply it, and create the object file.
2. Incorporate the updated module into the task's object library.
3. Rebuild the task and install it in the system, using MCR or VMR. Before using VMR, you must assign SY: and LB: to the disk containing the target system.

The following example replaces the module INSLB of the external MCR task Install:

```
>SET /UIC=[1,24]
>LBR INS/RP=[12,24] INSLB
```

If it was necessary to modify the external task's Task Builder command file during the last system generation, it may be necessary at this time to repeat those changes:

```
>SET /UIC=[1,24]
>ASN SY:=MP:
>TKB @INSBLD
>SET /SYSUIC
SYSUIC=[g,m]
>SET /UIC=[g,m]
>PIP /NV=[1,54] INS.TSK
>VMR
ENTER FILENAME: RSX11M
VMR>REM ...INS
VMR>INS INS
VMR>^Z
>RUN $SHUTUP
```

Hardware boot the system.

### C.3 UPDATING A DCL SOURCE MODULE

The procedure is different for the DCL task. There are two DCL object libraries: DCLR.OLB for modules in the root segment of the DCL task, and DCLO.OLB for modules in DCL's overlay segments. (One module, COMMAND, has versions in both the root and overlay libraries.) These libraries are located in UFD [1,24] of your distribution kit. If you are not sure whether a module belongs in the root or the overlay library, use LBR to scan the module names in the libraries. For instance, to view the module names in DCLO.OLB, enter the following command:

MCR:

```
LBR [1,24]DCLO/LI
```

DCL:

```
LIBRARY/LIST [1,24]DCLO
```

The modules you are most likely to need to modify are the DCL syntax tables which are in DCLO.OLB. (All DCL syntax tables are in overlay segments.) See Chapter 12 of the RSX-11M/M-PLUS System Management Guide for more information on the structure of the DCL task and on the DCL task-building process.

## APPLYING CORRECTIONS TO SOURCE FILES

File DCL.CMD, in UFD [23,24] of your distribution kit, can be used either to assemble DCL overlay modules and to re-task build DCL, or as a template for your own commands. The file contains its own instructions. Note that to use this command directly, you must copy various files into its UFD, and you must appropriately modify any UFDs that they reference. DCL.CMD also shows how to assemble the special module COMMAND.

The following process shows how to reassemble a DCL overlay module and re-task build DCL. The process is similar for root modules; simply specify DCLR rather than DCLO. See DCL.CMD for details on rebuilding COMMAND.

MCR:

```
SET /UIC=[23,24]
MAC XXX=[11,10]RSXMC/PA:1,[23,10]DCLMAC/PA:1,XXX
SET /UIC=[1,24]
LBR DCLO/RP=[23,24]XXX
TKB @DCLBLD
```

DCL:

```
SET DEFAULT [23,34]
MACRO [11,10]RSXMC/PASS:1,[23,10]DCLMAC/PASS:1,XXX
SET DEFAULT [1,24]
LIBRARY/REPLACE DCLO [23,24]XXX
LINK @DCLBLD
```

When you have built a new version of DCL.TSK, you must replace the old copy of DCL as a system CLI. This is done as follows: First, any terminals whose CLI is DCL must be logged off or set to another CLI. Then the following commands must be executed. (Note that these commands are MCR only.)

MCR:

```
CLI /ELIM=DCL
REM DCL
INS $DCL/CLI=YES
CLI /INIT=DCL
```

The REMove and INStall commands are also valid VMR commands and can be used to modify your system's image on disk. However, the CLI /INIT command is MCR only, and must be put in your system's startup file (if it is not there already).

### C.4 APPLYING CORRECTIONS TO THE FILE SYSTEMS (F11ACP)

All F11ACP updates begin by creating a SLP correction file in UFD [13,40]. The following example patches a module called WTRN1.

Boot your system and log in on a privileged account:

```
>HELLO SYSMANAGER
PASSWORD:
```

If necessary, restore the required files from the distribution tape. (This example assumes that the files in [13,10] have been deleted, but the files in [1,24] have not.)

## APPLYING CORRECTIONS TO SOURCE FILES

```
>UFD DB0:[13,10]
>UFD DB0:[13,40]
>BRU
BRU>/NOINITIALIZE/SUPERSEDE/NOPRESERVE/BACKUP_SET:MPLUSBL15SRC
FROM: MM0:[13,10]F11PRE.MAC,WTRN1.MAC
TO: DB0:
BRU--COMPLETED
BRU>^Z
```

Create the correction file:

```
>SET /UIC=[13,40]
>EDT WTRN1.COR
.
(Create correction file)
.
```

Apply the correction:

```
>SET /UIC=[13,10]
>SLP @[13,40]WTRN1.COR
```

Assemble the corrected module with the Executive macro library, the executive prefix file RSXMC.MAC, and the prefix file F11PRE.MAC:

```
>SET /UIC=[13,24]
>MAC WTRN1=[1,1]EXEMC/ML,[11,10]RSXMC,[13,10]F11PRE,WTRN1
```

Replace the defective module in the FCP library:

```
>SET /UIC=[1,24]
>LBR FCP/RP=[13,24]WTRN1
MODULES REPLACED
WTRN1
```

All of the task build command files require that the logical device MP: be assigned to the appropriate device. Depending on the size of the patch, it may be necessary to change the value in the partition specification contained in the task-build command file:

```
PAR=FCPPAR:0:nnn
```

In the following examples, xxx must be replaced by the 3-character designation for your desired FCP, that is, MDL or LRG.

Task build the new FCP using the updated library:

```
>ASN NL:=MP:
```

Edit the task-build command file, if necessary, at this time.

```
>TKB @FCPxxxBLD
```

## APPLYING CORRECTIONS TO SOURCE FILES

Install the updated FCP in the system image:

```
>SET /SYSUIC
SYSUIC=[g,54]
>SET /UIC=[g,54]
>PIP /NV=[1,54]FCPxxx.TSK
>RUN $VMR
ENTER FILENAME: RSX11M
VMR>REM F11ACP
VMR>INS FCPxxx/PAR=GEN/IOP=NO/CKP=NO
VMR>^Z
>RUN $SHUTUP
```

Reboot the system to place the new FCP in use.

### C.5 APPLYING CORRECTIONS TO RECONFIGURATION TASKS CON AND HRC

The following example illustrates how to patch module CNCMR for the CON task. Unless indicated otherwise, use a similar command sequence for correcting module HRONL for the HRC task.

This example assumes that:

- You have deleted the source files in [27,10].
- You have not deleted the object libraries and command files in [1,24] and [1,20].
- The object library for both CON and HRC is [1,24]OLR.OLB.
- The disk to which you will apply the patches is mounted Files-11 on drive DB0:.
- The distribution tape is mounted foreign on MM0:.

Perform the following steps to patch CNCMR:

1. Boot your system, and log into a privileged account.
2. If necessary, restore the required files from the distribution tape.

```
>UFD DB0:[27,10]
>UFD DB0:[27,40]
>UFD DB0:[27,24]
```

```
>BRU
BRU>/NOINITIALIZE/SUPERSEDE/NOPRESERVE/BACKUPSET:MPLUSBL15SRC
From: MM0:[27,10]CNPRES.MAC,CNCMR.MAC
To: DB0:
BRU -- Completed
```

If you were correcting module HRONL, you would substitute for the From: line in the previous command sequence:

```
MM0:[27,10]HRPRE.MAC,HRONL.MAC
```

3. Create the SLP correction file in UIC [27,40].

```
>SET /UIC=[27,40]
>EDT CNCMR.COR
```

•  
•  
•

## APPLYING CORRECTIONS TO SOURCE FILES

4. Apply the SLP correction file to CNCMR:

```
>SET /UIC=[27,10]
>SLP @[27,40]CNCMR.COR
```

5. Assemble the corrected CNCMR module using the Executive macro library and the Executive prefix file RSXMC.MAC: you also use these when assembling a corrected HRC module. In addition, use either the prefix file CNPRE.MAC if assembling a CON module or HRPRE.MAC if assembling an HRC module.

```
>SET /UIC=[27,24]
>MAC CNCMR=[1,1]EXEMC/ML,[11,10]RSXMC/PA:1,[27,10]CNPRE,CNCMR
```

6. Replace the CNCMR object module in the OLR library:

```
>SET /UIC=[1,24]
>LBR OLR/RP/NOEP=[27,24]CNCMR.OBJ
```

7. Task build CON using the updated library:

```
>ASN DB0:=IN:
>ASN DB0:=OU:
>ASN NL:=MP:

>TKB @CONBLD
```

### NOTE

If you do not have the task-build command files [1,24]CONBLD.CMD and [1,24]CONBLD.ODL, you must use the nonprivileged task-build section of SYSGEN in order to rebuild CON. For an HRC module, you must rebuild HRC if you do not have [1,24]HRCBLD.CMD and [1,24]HRCBLD.ODL.

8. Install the updated reconfiguration utility in the system image:

For CON, type:

```
>SET /SYSUIC
SYSUIC=[g,54]
>SET /UIC=[g,54]
PIP /NV=[1,54]CON.TSK
RUN $VMR
Enter filename: RSX11M
VMR>REM ...CON
VMR>INS CON
VMR>^Z
```

For HRC, type:

```
>SET /SYSUIC
SYSUIC=[g,54]
>SET /UIC=[g,54]
PIP /NV=[1,54]HRC.TSK
RUN $VMR
Enter filename: RSX11M
VMR>REM HRC...
VMR>INS HRC
VMR>^Z
```

9. In order to use the new reconfiguration tasks,

- Shut the system down using the shutup utility:

```
>RUN $SHUTUP
```

- Reboot the system.

## APPLYING CORRECTIONS TO SOURCE FILES

### C.6 APPLYING FCS CORRECTIONS

Correcting the FCS modules on an RSX-11M-PLUS system can be done by updating the source files, assembling them, and replacing modules in the system library, usually LB:[1,1]SYSLIB.OLB. This process is complicated by the fact that there are three kinds of FCS:

1. ANSI - supports ANSI format magnetic tape and big buffers
2. Non-ANSI - does not support ANSI tape or big buffers
3. Multibuffered - supports ANSI tape, big buffers, and multiple buffers.

An FCS source file like CLOSE.MAC contains conditional assembly directives that can produce three different CLOSE objects, depending on the global symbols defined when CLOSE.MAC is assembled. These three different CLOSE objects correspond to the three kinds of FCS. Other FCS source files, like DELETE.MAC, have no such conditional assembly directives. They are only assembled one way; that is, only one DELETE object exists.

The SYSLIB.OLB provided on the kits contains the ANSI FCS. Thus, this SYSLIB contains modules like CLOSE, assembled with the ANSI tape conditionals and big buffer conditionals enabled, and modules like DELETE, which have no such conditionals and are the same in any FCS.

An alternate system library called NOANSLIB.OLB is also provided. It contains an FCS that does not support ANSI tape, big buffers, or multiple buffers. Be sure that you know whether the SYSLIB on your system contains the ANSI FCS, or if it has been replaced with the non-ANSI or multibuffered FCS.

Details of the correcting procedure follow. MCR syntax is used throughout.

### C.7 UPDATING THE FCS SOURCES

The FCS source files are found in [50,10] on the kits. Updating a source is done by entering the correction file into [50,10], and entering "SLP @filename" to apply the correction.

### C.8 ASSEMBLING FCS

Assembling the updated source(s) can be done in either of two ways. One way is simple and time-consuming; the other is quick, but it must be done with great care. The simple way is to set your UIC to [50,20] and enter MAC @FCSASM. This will assemble every FCS variant properly, producing over 100 object files.

The other choice is to assemble only the sources that have been updated. This is not as simple, but it saves machine time. To assemble only a particular file, look at the five \*.CMD files in [50,20] on the kit. Search the command files for all mentions of the file you want to assemble. A description follows of each command file and what you do with its contents.



## APPLYING CORRECTIONS TO SOURCE FILES

1. FCSBOTH.CMD assembles files like DELETE.MAC, which contain no code specifically written to support or deny support to ANSI tape, big buffers, or multiple buffers. If the source file you have updated is mentioned in FCSBOTH.CMD, then it is assembled the same way regardless of which kind of FCS is in your SYSLIB. For example, this is the command line that assembles DELETE:

```
[50,20]DELETE,[50,30]DELETE/-SP=-  
[50,10]FCSPRE,DELETE
```

(FCSPRE.MAC defines necessary macros and global symbols.) To assemble DELETE.MAC, you should set your UIC to [50,20] and enter the following:

```
MAC [50,20]DELETE,[50,30]DELETE/-SP=[50,10]FCSPRE,DELETE
```

As an alternative, you could put the command line in a file and enter "MAC @filename". A file like DELETE.MAC, which has no conditional assembly directives, will be mentioned only in FCSBOTH.CMD.

2. FCSANSI.CMD assembles source files that contain ANSI tape, big buffer, or multiple-buffering conditionals. It produces objects for the ANSI kind of FCS. If your SYSLIB contains the ANSI FCS, and the source file you have updated is mentioned in FCSANSI.CMD, then you should use the command line you found in FCSANSI.CMD to assemble the source file. For example, this command line from FCSANSI.CMD assembles CLOSE.MAC:

```
[50,20]CLOSE.MTA,[50,30]CLOSE.MTA/-SP=-  
[50,10]FCSANSI/PA:1,FCSBIGBUF/PA:1,FCSPRE,CLOSE
```

FCSANSI.MAC enables the ANSI tape conditional assembly directives, and FCSBIGBUF.MAC enables the big buffer conditionals. Note the sequence of input file names. It is absolutely imperative that the source file is the last file name specified, and that FCSPRE is next to it, in every FCS assembly. Otherwise, the proper conditionals will not be enabled, with potentially confusing and dangerous results. Any file that is assembled by FCSANSI.CMD is also assembled by FCSNOANSI.CMD and FCSMULBUF.CMD. Note the "MTA" file types above, which distinguish between the three kinds of CLOSE objects.

3. FCSNOANSI.CMD also assembles source files that contain ANSI tape, big buffer, or multiple-buffering conditionals. It produces objects for the non-ANSI kind of FCS. If your SYSLIB contains the non-ANSI FCS, and the source file you have updated is mentioned in FCSNOANSI.CMD, then you should use the command line you found in FCSNOANSI.CMD to assemble the source file. This command line from FCSNOANSI.CMD assembles CLOSE.MAC:

```
[50,20]CLOSE.NMT,[50,30]CLOSE.NMT/-SP=-  
[50,10]FCSPRE,CLOSE
```



## APPLYING CORRECTIONS TO SOURCE FILES

4. FCSMULBUF.CMD assembles source files that contain ANSI tape, big buffer, or multiple-buffering conditionals. It produces objects that support all of these features. This command line from FCSMULBUF.CMD assembles CLOSE.MAC:

```
[50,20]CLOSE.MBF,[50,30]CLOSE.MBF/-SP=-  
[50,10]FCSANSI/PA:1,FCSMULBUF/PA:1,FCSBIGBUF/PA:1,FCSPRE,CLOSE
```

FCSMULBUF.MAC enables the multiple-buffering conditionals.

5. FCSASM.CMD simply causes the other command files to be executed, to assemble FCS in all ways. If you are assembling single sources, ignore FCSASM.CMD.

More information is necessary to correctly assemble a few FCS sources that require additional prefix files. These sources are GET.MAC, PUT.MAC, OPEN.MAC, FINIT.MAC, and RDWRIT.MAC. GET.MAC can be assembled in the normal way (ANSI, non-ANSI, or multibuffered) to produce GET.MTA, GET.NMT, or GET.MBF. An additional file, GPSEQ.MAC, will enable conditional assembly directives in GET.MAC to produce GETSQ, the sequential GET module, for each kind of FCS. For example, this is the command line from FCSANSI.CMD, which produces GETSQ.MTA:

```
[50,20]GETSQ.MTA,[50,30]GETSQ.MTA/-SP=-  
[50,10]GPSEQ/PA:1,FCSANSI/PA:1,FCSBIGBUF/PA:1,FCSPRE,GET
```

If you correct GET.MAC, be sure that you assemble it to produce objects GET and GETSQ, for whatever kind of FCS your SYSLIB contains.

Similarly, GPSEQ.MAC will produce PUTSQ, the sequential PUT module, for each kind of FCS. This is the command line from FCSNOANSI.CMD, which produces PUTSQ.NMT:

```
[50,20]PUTSQ.NMT,[50,30]PUTSQ.NMT/-SP=-  
[50,10]GPSEQ/PA:1,FCSPRE,PUT
```

If you correct PUT.MAC, be sure that you assemble it to produce objects named PUT and PUTSQ.

OPEN.MAC can be assembled in the normal way (ANSI, non-ANSI, or multibuffered) to produce OPEN.MTA, OPEN.NMT, or OPEN.MBF. Three additional prefix files exist.

OPFID.MAC produces the open-by-file-id module, OPFID. This is the command line from FCSANSI.CMD, which produces OPFID.MTA:

```
[50,20]OPFID.MTA,[50,30]OPFID.MTA/-SP=-  
[50,10]OPFID/PA:1,FCSANSI/PA:1,FCSBIGBUF/PA:1,FCSPRE,OPEN
```

OPFNB.MAC produces the open-by-file-name block module, OPFNB. This is the command line from FCSANSI.CMD, which produces OPFNB.NMT:

```
[50,20]OPFNB.NMT,[50,30]OPFNB.NMT/-SP=-  
[50,10]OPFNB/PA:1,FCSPRE,OPEN
```

OPENR.MAC produces the open module for resident libraries, OPENR. This is the command line from FCSMULBUF.CMD, which produces OPENR.MBF:

```
[50,20]OPENR.MBF,[50,30]OPENR.MBF/-SP=-  
[50,10]OPENR/PA:1,FCSANSI/PA:1,FCSMULBUF/PA:1,FCSBIGBUF/PA:1,FCSPRE,OPEN
```

If you correct OPEN.MAC, be sure that you assemble it to produce objects OPEN, OPFID, OPFNB, and OPENR, for whatever kind of FCS your SYSLIB contains.

## APPLYING CORRECTIONS TO SOURCE FILES

FINIT.MAC and RDWRIT.MAC can be assembled to produce FINIT.OBJ and RDWRIT.OBJ. The prefix file FCSSUP.MAC enables conditionals to produce objects FINTSL.SUP and RDWRSL.SUP to be used in supervisor-mode libraries. These objects are necessary for correct execution of the user AST completion routines, which may be specified for FCS READ\$ and WRITE\$ functions. This is the line from FCSANSI.CMD, which produces FINTSL.SUP:

```
[50,20]FINTSL.SUP,[50,30]FINTSL.SUP/-SP=[50,10]FCSSUP/PA:1,FCSPRE,FINIT
```

Object files FINTSL.SUP and RDWRSL.SUP contain the same entry point names as FINIT.OBJ and RDWRIT.OBJ. Therefore they must be replaced in SYSLIB with their entry points deleted, so that they are only used when they are explicitly called when a supervisor-mode library is task-built. See the example below.

### C.9 REPLACING THE FCS OBJECT MODULES

Set your UIC to [1,1], make a backup copy of the libraries, and use LBR to replace the corrected FCS objects that you have assembled. For example, suppose you have updated and assembled DELETE, PUT, and FINIT on a system with an ANSI FCS in SYSLIB:

```
SET /UIC=[1,1]
PIP /NV=SYSLIB.OLB
LBR SYSLIB/RP=[50,20]DELETE.OBJ,PUT.MTA,PUTSQ.MTA
LBR SYSLIB/RP=[50,20]FINIT.OBJ,FINTSL.SUP/-EP
```

Suppose you also use NOANSLIB.OLB:

```
PIP /NV=NOANSLIB.OLB
LBR NOANSLIB/RP=[50,20]DELETE.OBJ,PUT.NMT,PUTSQ.NMT
LBR NOANSLIB/RP=[50,20]FINIT.OBJ,FINTSL.SUP/-EP
```

If you want to incorporate the corrected modules into an FCSRES resident library or FCSFSL supervisor-mode library, rebuild the library, and then rebuild every task that links to it with SYSGEN. If you rebuild and install a resident library and run a task that linked to the old resident library, then the task will call routines in the resident library at the wrong addresses. The results will be uncertain and potentially damaging, especially for privileged tasks.

### C.10 PATCHING OBJECT MODULES

The Object Module Patch Utility (PAT) incorporates an object patch into an existing object module. DIGITAL publishes a patch file written in MACRO-11 assembly language to correct an error or make a change. You then create and assemble the published file and input it to PAT along with the object file being patched.

You must include the published checksum values in the specification for the input file and the correction files. If the checksum value does not agree with the computed result, PAT reports an error. If the correction file caused the error, check the source file against the original published source file to verify that it was copied correctly. If the input file caused the error, verify that the correct version of the file is being patched.

## APPLYING CORRECTIONS TO SOURCE FILES

Note that it normally is necessary to use LBR to extract the original object module from a library. PAT produces a new object module file containing the corrected object code. When you patch modules from a library, take the object module from the distributed library, correct it, and then put it into a copy of the original library. (All corrections are put in the copy, which is used to rebuild the task.) The following guidelines apply to the formats for PAT command input and correction files.

Specify an explicit name, extension, and version number for each file. Use the following conventions for names:

File	Specification
Correction file source	name.PAT
Correction file object	name.POB
Input file object	name.OBJ;n
Corrected object file	name.OBJ;n+1

Specify checksums for all input and correction files.

The following example illustrates the command formats for creating the correction file and the PAT output file:

```
>MAC NAME.POB=NAME.PAT
>LBR NAME.OBJ;1=LIBRARY.OLB;1/EX:NAME
>PAT NAME.OBJ;2=NAME.OBJ;1/CS:xxxx,NAME.POB/CS:yyyy
>PIP LIBRARY.OLB;2=LIBRARY.OLB;1
>LBR LIBRARY.OLB;2/RP=NAME.OBJ;2
```



## INDEX

- Account File Maintenance Program
  - See ACNT
- ACNT
  - password encryption, 1-37
- Batch job, 1-40
- Batch log, 2-8
- BRU, 1-31
  - and BAD, 1-32
  - appending, 1-31
  - boot block, 1-34
  - bootable system image, 1-32
  - device support, 1-34
  - devices, 2-10
  - devices, new, 1-31
  - documentation corrections, 2-8
  - error message, 2-10
  - indirect command file, 2-9
  - memory for stand-alone, 1-34
  - /MOUNTED, 1-34
  - multivolume backup, 1-33
  - /NEW VERSION qualifier, 1-32
  - /NOSUPERSEDE qualifier, 2-9
  - qualifiers, 1-33
  - restoring, 1-31, 1-33
  - restrictions, 1-31
  - stand-alone, 2-10
  - /VERIFY, 2-9
  - /VERIFY qualifier, 1-32
  - wildcards, 2-9
- Buffering
  - big, 1-51
  - multi, 1-51
- Catch all task
  - TDX, 1-25
- CDA, 1-39
  - device support, 1-39
  - system assign table, 1-39
- Checkpointing
  - TKB, 1-61
- Common
  - directive, 1-53
  - preserving changes, 1-10
- Controllers, new, 1-2
- CPUs
  - LSI-11/73, 1-4
  - MicroPDP-11, 1-4
  - MicroPDP-11/23, 1-4
  - MicroPDP-11/73, 1-4
  - MicroPDP-11/83, 1-4
  - PDP-11/84, 1-4
- Crash Dump Analyzer
  - See CDA
- Data Terminal Emulator
  - See DTE
- Data, asynchronous, 1-51
- DCL, 1-18
  - command, modified, 1-23
- DCL (Cont.)
  - commands, new, 1-18
  - documentation corrections, 2-3
  - logical names, 1-23
  - qualifiers, new, 1-20
  - restriction, 1-23
  - RUN/COMMAND command, 2-2
  - SHOW DEVICES command, 2-2
  - /DE switch, 2-12
- Debugging, 2-7
- Decimal version numbers, 1-23
- DECmail-11, 1-70
  - installation, 1-71
  - logical names, 1-70
  - named directory, 1-70
- DECUS, A-1
  - /DELETE switch restriction, 1-40
- Device drivers, 1-46
- Devices
  - discontinued, 1-5
  - KDA50 controller, 1-3
  - LN03 printer, 1-5
  - overview, 1-2
  - printers, 1-5
  - processors, 1-4
  - RD52 disk, 1-2
  - RD53 disk, 1-2
  - restrictions, 1-7
  - RQDX2 controller, 1-3
  - RQDX3 controller, 1-3
  - RUX50 UNIBUS interface, 1-3
  - TK25 tape, 1-3
  - TK50 tape, 1-3
- Directives, 1-13
- Directory
  - default, 1-17
  - named, 1-17
  - protection UIC, 1-17
- Disk data caching, 1-17
- Disks
  - new, 1-2
  - target, 1-8
- DLVJ1, 1-5
- DMP
  - /HF switch, 2-11
  - /LIM switch, 2-10
- Drivers, 1-47
  - vectored, 1-53
- DTE
  - error message, 1-38
  - modem support, 1-5
- Error logging, 1-56
  - control files, 1-57
  - DCL commands, 1-57
  - documentation corrections, 2-22
  - error log packet format, 2-22
  - hard and soft limits, 1-58
  - MCR commands, 1-57
  - restriction, 1-58

# INDEX

- Error logging (Cont.)
  - user-written module, 1-56
- Executive, 1-14
  - CLI, 1-16
  - data structures, 1-15
  - directives, 1-14
  - documentation corrections, 2-6
  - drivers, 1-15
  - entry points, 1-15
  - FORTRAN, 1-14
  - full-functionality, 1-17
  - macro expansion, 2-6
  - mapping register symbols, 1-15
  - parameter lists, 2-6
  - PASCAL, 1-14
  - privileged tasks, 1-15
  - programming language interface, 1-14
  - routines, moved, 1-15
  - vectored, 1-52
- FCS, 1-42
  - directory, 1-42
- FCS resident library, 1-60
- File Control Service
  - See FCS, 1-42
- File Descriptor Block (FDB)
  - offsets, 1-49
- File specification
  - decimal version numbers, 1-23
- FLX
  - /DE switch, 2-12
  - device support, 1-35
  - error message, 2-12
  - /NU switch, 2-12
  - restrictions, 1-35
  - /RT switch, 2-12
  - RT-11 device, 1-36
  - transfer mode switches, 2-11
  - /ZE switch, 2-12
- FMS-11 restriction, 1-65
- FMT
  - device restrictions, 1-36
  - devices, 2-12
- Full-functionality Executive
  - TKB, 1-61
- HELP files, 1-33
- /HF switch, 2-11
- /HOLD switch restriction, 1-40
- I/O
  - asynchronous, 1-51
  - completion, overlapped, 1-55
  - processing, 1-55
  - requests, 1-51, 1-55
  - restrictions, 1-51
  - routines, 1-50, 1-51
  - sequential processing, 1-55
  - user-written, 2-20
- Indirect
  - delimiters, 1-29
  - directive, new, 1-29
  - documentation corrections, 2-5
- Indirect (Cont.)
  - error message, 1-30
  - expressions, 1-29
  - .FORM modification, 1-29
  - module name size, 1-30
  - .ONERR directive, 2-5
  - restriction, 1-30
  - symbols, 1-29, 1-30, 2-5
  - time-out values, 2-5
- Indirect Command Processor
  - See Indirect
- INI /BAD command (MCR), 2-5
- INI command (MCR), 2-4
- INS, 1-25
- INSTALL /WB command, 1-10
- IOX
  - SELECT command, 1-37
  - terminal exercising, 1-37
- IP11, 1-4
- IPV11, 1-4
- KDA50 controller, 1-3
- Layered products, 1-65
  - named directories, 1-17, 1-65
  - /NONAMED qualifier, 1-17
  - /NONAMED switch, 1-17
- LBR
  - /CR switch, 2-13
  - CREATE command, 2-13
  - documentation corrections, 2-13
  - file attributes, 2-13
  - /IN switch, 2-13
- /LI switch, 2-18
- /LIM switch, 2-11
- LK201 keyboard restriction, 1-7
- LN03 printer, 1-5
- Log file, 2-8
- Logical names, 1-11
  - colons in, 1-12
  - ddnn: form, 1-12
  - DECmail-11, 1-70
  - directives, 1-13
  - equivalence names, 1-11
  - FCS, 1-13, 1-49
  - filespec format, 1-48
  - /FINAL, 1-12
  - format, 1-11
  - functionality, old, 1-12
  - MACRO-11, 1-65
  - parser, new, 1-49
  - parsing, 1-49
  - RMS, 1-13
  - system table, 1-11
  - translations, 1-11
- LSI-11/73 processor
  - configurations, 1-4
- MACRO-11, 1-65
  - logical names, 1-65
  - MCS support, 1-67
- Magnetic tape, new, 1-2
- MCR, 1-23
  - commands, new, 1-24

# INDEX

MCR (Cont.)  
     documentation corrections, 2-4  
     INI command description, 2-4  
     keywords, modified, 1-25  
     keywords, new, 1-24  
 Micro/PDP-11, 1-8  
 MicroPDP-11/23, 1-8  
  
 Named directory, 1-17  
     DECmail-11, 1-70  
     FMS-11, 1-65  
     layered products, 1-65  
 NCT, 1-23  
 Network Command Terminal (NCT),  
     1-23  
 /NOSUPERSEDE qualifier, 2-9  
 /NU switch, 2-12  
  
 ODT, 2-7  
  
 P/OS  
     logical names, 1-13  
 Password  
     encryption, 1-37  
     length, 1-37  
     setting, 1-37  
 PAT  
     documentation corrections, 2-13  
     error message, 2-13  
 /-PI switch, 2-18  
 PIP  
     /DD switch, 2-14  
     documentation corrections, 2-14  
     /TD switch, 2-14  
 Pre-generated kit options, 1-37  
 PRINT /[NO]TRANSFER command (DCL),  
     2-8  
 PRINT command  
     log file, 2-8  
 Printer mode, 1-6  
 Printers  
     LA100, 1-5, 1-7  
     LA50, 1-5  
     LN01, 1-5  
     LN03, 1-5  
     modifying support, 1-6  
     page size, 1-6  
     removing support, 1-6  
     standard, 1-7  
     SYSGEN, 1-5  
 Protection  
     ACNT, 1-17  
     default, 1-17  
     setting, 1-17  
 Protection UIC, 1-17  
  
 RC25, 1-46  
 RD52 disk, 1-2  
 RD53 disk, 1-2  
 Record Management Services  
     See RMS-11  
 REMOVE command, 1-10  
 Reporting problems  
     RMS-11, 3-15  
  
 Resident library configuration,  
     3-1  
     RMSLBL.TSK, 3-2  
     RMSLBM.TSK, 3-2  
     RMSRES.TSK, 3-1  
 Resource Monitor Display  
     See RMD  
 /RESTART switch restriction, 1-40  
 RMD, 1-38  
     documentation correction, 2-7  
     task status flags, 2-4  
 RMS-11  
     access methods, 3-4, 3-7  
     documentation changes, 3-9,  
         3-10  
     error messages, 3-2, 3-5, 3-7,  
         3-10, 3-13  
     files in the distribution kit,  
         3-10  
     installation, 3-13  
     logical name interface, 3-3  
     new features, summary, 3-1  
     operations, 3-1, 3-2, 3-7  
     remote access  
         to RSTS/E, 3-3  
     reporting problems, 3-15  
         See also Reporting problems  
     startup command procedure, 3-13  
     utilities  
         command and ODL files, 3-14  
         rebuilding, 3-15  
         RMSBCK, 3-4  
         RMSCNV, 3-3, 3-6, 3-7  
         RMSDES, 3-5  
         RMSDSP, 3-4  
         RMSIFL, 3-6, 3-7  
         RMSRST, 3-4, 3-8  
 RMSBCK, 3-4  
     switches, 3-4  
 RMSCNV, 3-3, 3-6, 3-7  
 RMSDES, 3-5, 3-6, 3-9  
 RMSDSP, 3-4, 3-9  
     switches, 3-4  
 RMSIFL, 3-6, 3-7  
 RMSRST, 3-4, 3-8  
     switches, 3-4  
 RQDX2 controller, 1-3  
 RQDX3 controller, 1-3  
 /RT switch, 2-12  
 RT-11  
     device support, 1-35  
 RUN/COMMAND command (DCL), 2-2  
  
 /-SE switch, 1-15  
 /SHAREABLE:LIBRARY qualifier,  
     2-19  
 SHOW DEVICES command (DCL)  
     format, 2-2  
 SHUTUP, 1-38  
 Slow Task Builder, 1-61  
 SLP  
     documentation corrections, 2-14  
     error message, 2-15  
     file names, 2-15

## INDEX

- SLP (Cont.)
  - incorrect examples, 2-14
- Software performance monitor, 1-9
- Software Performance Report
  - See SPR
- Source files
  - correcting, C-1
  - updating, C-1
- SPM-11 modification, 1-9
- Spooling
  - restriction, 1-39
- spooling commands, 1-39
- SPR
  - definition, B-1
  - filling one out, B-1
  - priorities assigned, B-2
  - types, B-2
- Status control block, 2-21
- SUBMIT command (MCR)
  - format, 2-7
- SYSGEN
  - See also System Generation
  - crash device, 1-9
  - creating directories, 1-10
  - IP11 subsystem, 1-10
  - MSCP command, 1-10
  - nonprivileged tasks, 1-10
  - optional features, 1-9
  - questions, 1-9, 1-10, 2-1
  - response rings, 1-10
  - software performance monitor, 1-9
  - VAX, on a, 1-8
- SYSLIB
  - documentation corrections, 2-15
  - new date routine (MCS), 1-40
  - program section names, 2-16
  - routines, 2-16
- System Generation, 1-8
  - See also SYSGEN
  - device support, 1-9
  - I/O terminal driver support, 1-9
  - LAT support, 1-9
  - optional features, 1-9
  - processor support, 1-8
  - target disks, 1-8
  - terminal support, 1-10
  - VAX, on a, 1-8
- System library routines
  - see SYSLIB
- Tape, new, 1-2
- Task
  - checkpointing, 1-51
  - directive common, 1-53
  - entry points, 1-52
  - Executive, 1-15
  - Executive code, 1-53
  - I- and D- space, 1-64
  - I/O, 1-51
  - installing permanently, 1-28
  - vectoring, 1-52
- Task builder
  - see TKB
- TCB, 1-52
- TDX, 1-25
  - and MCR, 1-25
  - commands, 1-25
  - definition, 1-25
  - installing, 1-25
  - installing permanently, 1-28
  - modifying, 1-28
- Terminal Exercising
- Terminals, new, 1-2
- TK25 magnetic tape, 1-3
- TK50 tape
  - brief description, 1-3
  - BRU, 1-44
  - description, 1-42
  - driver, 1-47
  - indicator lights, 1-45
  - limitations, 1-43
  - restriction, 1-7
  - use with utilities, 1-43
- TKB, 1-59
  - /AL switch, 1-61
  - autoload vectors, 1-63
  - build code, 1-60
  - checkpointing, 1-61
  - /CL switch, 1-59
  - common/library block, 2-19
  - /CP switch, 1-61
  - documentation corrections, 2-16
  - error message, 2-19
  - Fast Task Builder (FTB), 1-59, 1-60
  - FCS resident library, 1-60
  - FCSFSL, 1-60
  - FCSRES, 1-60
  - /FM switch, 1-60
  - full-functionality Executive, 1-61
  - I- and D- space tasks, 1-64
  - /LI switch, 2-18
  - library, 1-61, 1-63
  - LINK/CODE:CLI command, 1-59
  - LINK/CODE:FAST\_MAP command, 1-60
  - LINK/SLOW command, 1-59
  - /-PI switch, 2-18
  - qualifiers, new, 1-59
  - restrictions, 1-63
  - root statements, 2-17
  - /SB switch, 1-59, 1-61
  - /SHAREABLE:LIBRARY qualifier, 2-19
  - SKTBLD.BLD command procedure, 1-62
  - Slow Task Builder (STK), 1-61
  - /SS switch, 1-63
  - supervisor-mode, 1-60, 2-18
  - restriction, 1-62
  - switches, new, 1-59
  - symbol table file, 1-64
  - task label block, 2-19



## INDEX

UIC, 1-17  
Update procedure, 2-1  
  
VAX-11 RSX, 1-8  
Vectored Executive, 1-52 to 1-55  
Vectoring, 1-52 to 1-55  
    drivers, 1-53  
/VERIFY qualifier, 2-9  
Version number  
    decimal, 1-23  
Virtual Monitor Console Routine  
    See VMR  
VMR  
    new keywords, 1-38  
Volume label format, 1-50  
  
/WB qualifier, 1-10  
Writing device drivers, 1-51  
Writing I/O drivers  
    \$ASUMR, 2-21  
    data structures, 2-20  
    documentation corrections, 2-20  
    GTPKT\$ call, 2-20  
    K.OWN, 2-21  
    SCBDF\$, 2-21  
    U.BUF, 2-21  
    US.FOR, 2-20  
    US.PUB, 2-20  
  
/ZE switch, 2-12



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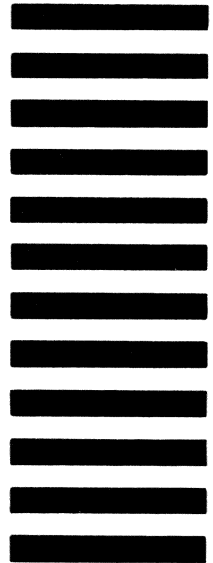
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